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**COAST AND GEODETIC SURVEY**

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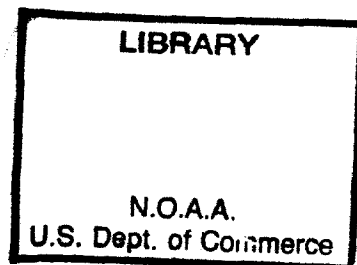
**UNITED STATES COAST PILOT 3**

**ATLANTIC COAST**

**Sandy Hook to Cape Henry**

**EIGHTH (May 14, 1966) EDITION**

**Corrected through NM-20/66**



**COAST & GEODETIC SURVEY**

**APR 3 1967**

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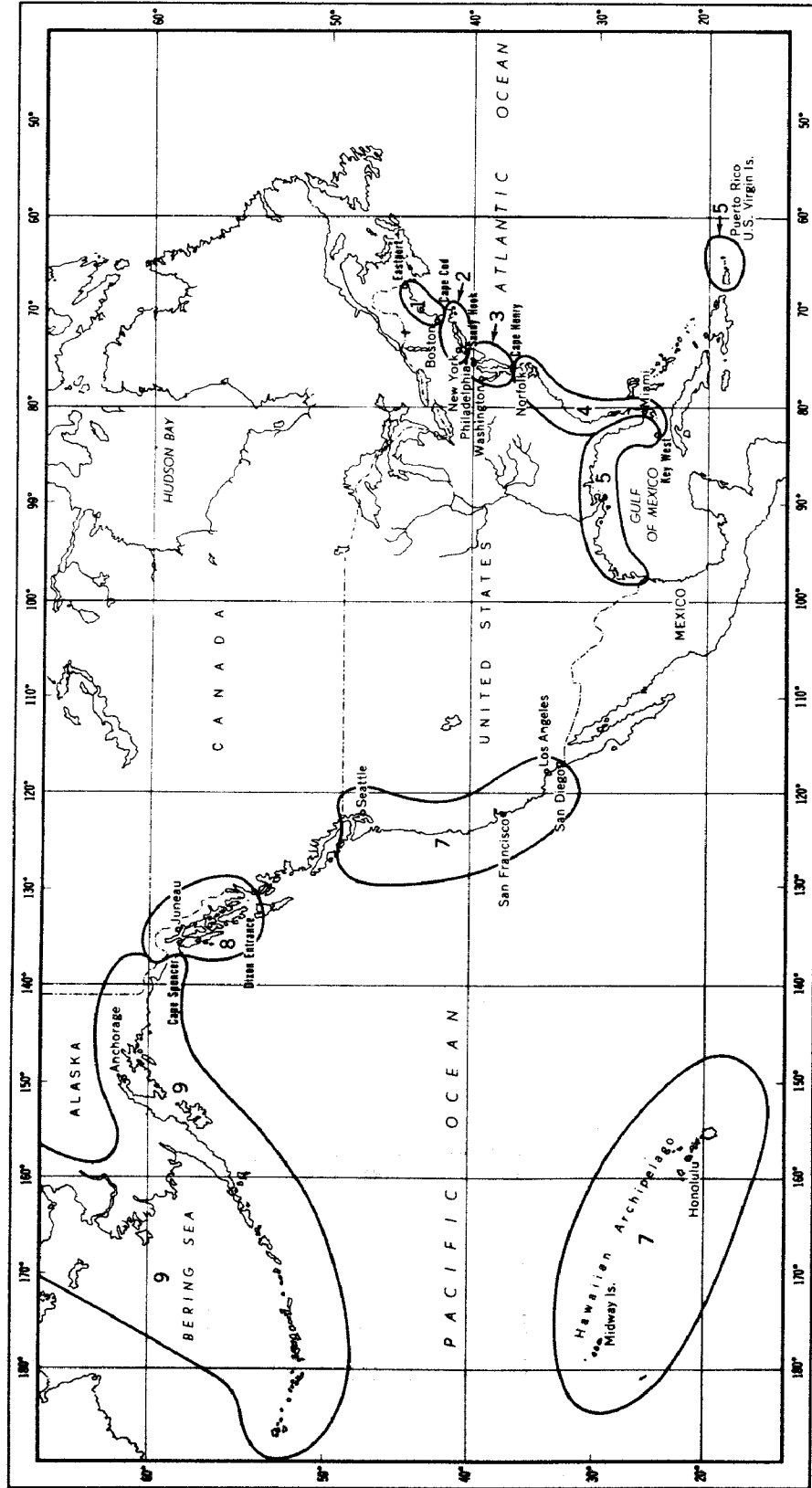
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## Pacific Coast

- 1 Eastport to Cape Cod
- 2 Cape Cod to Sandy Hook
- 3 Sandy Hook to Cape Henry
- 4 Cape Henry to Key West
- 5 Gulf of Mexico, Puerto Rico

- 7 California, Oregon, Washington, and Hawaii  
8 Alaska - - Dixon Entrance to Cape Spencer  
9 Alaska - - Cape Spencer to Beaufort Sea



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## Preface

United States Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, Eighth (May 14, 1966) Edition, is based upon the work of the U.S. Coast and Geodetic Survey and includes the April-June 1965, field observations of Marine Information Specialist Lloyd L. Clay. Area information also was obtained from the U.S. Coast Guard, the U.S. Army Engineers, local port authorities, and others. The preceding Seventh (1961) Edition is canceled.

**Cumulative Supplements, containing revisions and new information reported since edition date of Coast Pilot, usually are issued early each year. Free copies of Supplements may be obtained by completing the coupons in the back of this book and mailing them to the Coast and Geodetic Survey.**

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## 1. GENERAL INFORMATION

**UNITED STATES COAST PILOTS.**—The C&GS Coast Pilots are a series of eight nautical books that cover a wide variety of information important to navigators of United States coastal and intracoastal waters. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. A new edition of each Coast Pilot is published at intervals ranging from 4 to 10 years. Cumulative **Supplements**, containing changes reported since dates of editions, are published early each year and are distributed free.

**Bearings.**—These are true, and when given in degrees are clockwise from 000° (north) to 359°. Light-sector bearings are toward the light.

**Bridges and cables.**—Clearances of bridges and overhead cables are in feet above normal high water unless otherwise stated; clearances of drawbridges are for the closed position. They may be as-built, authorized, or reported, and are so identified on the charts. Also see charts for horizontal clearances of bridges; these are repeated in the Coast Pilots only when they are less than 50 feet and then only in terms of channel width or length of span.

**Courses.**—These are true and are given in degrees clockwise from 000° (north) to 359°. The courses given are the courses to be made good.

**Currents.**—Stated current velocities are the averages at strength. Velocities are in knots, which are nautical miles per hour. Directions are the true directions to which the currents set.

**Depth units.**—Depths are in feet or fathoms below the low-water tidal datum of the charts unless otherwise stated.

**Distances.**—These are in nautical miles unless otherwise stated. A nautical mile is 1 minute of latitude, or approximately 2,000 yards, and is about 1.15 statute miles.

**Elevations.**—These are in feet above the plane of reference used for that purpose on the charts.

**Light and fog-signal characteristics.**—These are not described, and light sectors are seldom defined. See Coast Guard Light Lists.

**Radio navigational aids.**—These are seldom described. See Coast Guard Light Lists.

**Ranges.**—These are not fully described. "A 339° range" means that rear range structure bears 339° from front structure. See Coast Guard Light Lists.

**Winds.**—Directions are the true directions from which the winds blow. Velocities are in knots, which are nautical miles per hour.

5 The **COAST AND GEODETIC SURVEY** is required to provide charts and related information for the safe navigation of marine and air commerce, and to provide basic data for engineering and scientific purposes and for other commercial and industrial needs.

10 **Field offices** of the Coast and Geodetic Survey are located at some of the principal ports in the United States; see Appendix. Files of charts, Coast Pilots, and other publications are maintained at these offices for the use of mariners, who are invited to avail themselves of the facilities afforded.

15 **Sales agents** for Charts, Coast Pilots, Tide Tables, Tidal Current Tables, and Tidal Current Charts of the Coast and Geodetic Survey are located in many ports of the United States and in some foreign ports. Orders mailed to C&GS headquarters should be accompanied by check or money order, made payable to C&GS, Department of Commerce.

20 **Special signals for surveying vessels.**—Pilot Rules for Inland Waters, § 80.33, state that by day a surveying vessel of the Coast and Geodetic Survey, underway and employed in hydrographic surveying, may carry in a vertical line, one over the other not less than 6 feet apart where they can best be seen, three shapes not less than 2 feet in diameter of which the highest and lowest shall be globular in shape and green in color and the middle one diamond in shape and white.

25 (a) Vessels of the Coast and Geodetic Survey shall carry the above-prescribed marks while actually engaged in hydrographic surveying and underway, including drag work. Launches and other boats shall carry the prescribed marks when necessary.

30 (b) It must be distinctly understood that these special signals serve only to indicate the nature of the work upon which the vessel is engaged and in no way give the surveying vessel the right-of-way over other vessels or obviate the necessity for a strict observance of the rules for preventing collisions of vessels.

35 (c) By night a surveying vessel of the Coast and Geodetic Survey, underway and employed in hydrographic surveying, shall carry the regular lights prescribed by the rules of the road.

40 (d) A vessel of the Coast and Geodetic Survey, when at anchor in a fairway on surveying operations, shall display from the mast during the daytime two black balls in a vertical line and 6 feet apart. At night two red lights

shall be displayed in the same manner. In the case of a small vessel the distance between the balls and between the lights may be reduced to not less than 3 feet if necessary.

(e) Such vessels, when at anchor in a fairway on surveying operations, shall have at hand and show, if necessary, in order to attract attention, a flare-up light in addition to the lights which are, by this section, required to be carried.

International Rules of the Road, Part B, Rule 4(c), states that a vessel engaged in laying or in picking up a submarine cable or navigation mark, or a vessel engaged in surveying or underwater operations, or a vessel engaged in replenishment at sea, or in the launching or recovery of aircraft when from the nature of her work she is unable to get out of the way of approaching vessels, shall carry, in lieu of the lights prescribed in Rule 2(a) (i) and (ii), or Rule 7(a) (i), three lights in a vertical line one over the other so that the upper and lower lights shall be the same distance from, and not less than 6 feet above or below, the middle light. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all round the horizon at a distance of at least 2 miles. By day, she shall carry in a vertical line one over the other not less than 6 feet apart, where they can best be seen, three shapes each not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and red in color, and the middle one diamond in shape and white.

The wire drags used by the Coast and Geodetic Survey in sweeping for dangers to navigation may be crossed by vessels without danger of fouling at any point except between the towing launches and the large buoys near them, where the towline approaches the surface of the water. Vessels passing over the drag are requested to change course so as to cross it approximately at right angles, as a diagonal course may cause the propeller to foul the supporting buoys and attached wires. No attempt should be made to pass between the drag launches while the wire is being set out or taken in, unless it would endanger a vessel to do otherwise, because the bottom wire is slack and the floats at each 100-foot section may lift it nearly to the surface; at this time the launches usually are headed directly toward or away from each other and the operation may be clearly seen.

Nautical charts are published primarily for the use of the mariner but serve the public interest in many other ways. They are compiled principally from Coast and Geodetic Survey basic field surveys, supplemented by data from other Government organizations.

The scales of nautical charts range from 1:2,500 to about 1:5,000,000. Graphic scales are generally shown on charts with scales of 1:80,000 or larger, and numerical scales are given on smaller-scale charts. Coast and Geodetic Survey charts are classified according to scale as follows:

**Sailing charts**, scales 1:600,000 and smaller, are for use in fixing the mariner's position as he approaches the

coast from the open ocean, or for sailing between distant coastwise ports. On such charts the shoreline and topography are generalized and only offshore soundings, the principal lights, outer buoys, and landmarks visible at considerable distances are shown.

**General charts**, scales 1:100,000 to 1:600,000, are for coastwise navigation outside of outlying reefs and shoals.

**Coast charts**, scales 1:50,000 to 1:100,000, are for in-shore navigation leading to bays and harbors of considerable width and for navigating large inland waterways.

**Harbor charts**, scales larger than 1:50,000, are for harbors, anchorage areas, and the smaller waterways.

**Special charts**, various scales, cover the Intracoastal waterways and miscellaneous small-craft areas.

The date of a chart is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Up-to-date charts should be obtained at regular intervals.

The Mercator projection used on most nautical charts has straight-line meridians and parallels that intersect at right angles. On any particular chart the distances between meridians are equal throughout, but distances between parallels increase progressively from the equator toward the poles, so that a straight line between any two points is a rhumb line. This unique property of the Mercator projection is one of the main reasons why it is preferred by the mariner.

**Echo soundings.**—Most of the various types of echo sounder are calibrated for a velocity of sound in water of 800 fathoms per second, but the actual velocity may differ from the calibrated value by as much as 5 percent, depending upon the temperature and salinity of the waters in which the vessel is operating; the highest velocities are found in warm, highly saline water, and the lowest in icy, fresh water. Variation in the line voltage can also cause errors of 10 percent or more in reading. Echoes can be obtained from schools of fish; in fact, trawlers are using the sounders for that purpose. The most serious error commonly occurs where the depth is greater than the scale range of the instrument; a 400-fathom scale indicates 15 fathoms visually and graphically when the depth is 415 fathoms. Where possible, wide variations from charted depths should be checked by wire soundings.

The plane of reference for depths on C&GS charts is the mean of all low waters for the Atlantic coast of the United States, including the West Indies, and the mean of the lower low waters for the Pacific coast, including the Hawaiian Islands and Alaska. The plane most frequently used on foreign charts is mean low water springs. The effect of strong winds, in combination with the regular tidal action, may at times cause the water level to fall considerably below the reference plane.

**Compass roses on charts.**—The annual change in variation gradually introduces an error in the magnetic compass roses on charts. The compass roses are replotted for every new edition of the chart if the error is appreciable; and the amount and date of the variation and the

amount of annual change are stated for each compass rose. On some of the sailing and general charts the magnetic variation is shown by isogonic lines.

**Deviation of the compass.**—The magnetic effect of the ship itself combines with any instrumental error of the compass to cause the deviation, which varies with the heading of the ship and with the magnetic latitude. It is customary to counteract the deviation as far as possible with soft iron and permanent magnets, suitably placed in or on the binnacle.

**Local magnetic disturbance.**—The charts show areas where the compass is disturbed by magnetic masses external to the ship. Such disturbances are fairly common in shallow waters but are never encountered over oceanic depths. Magnetic force diminishes so rapidly with distance that a magnetic center on land would have to be of unprecedented intensity to affect the compass of a vessel 0.5 mile from shore.

**Overhead cables** are shown on the charts and described in the Coast Pilots; the clearances given are for the lowest wires at high water. Vessels with masts, stacks, booms, or aerials should allow for an additional clearance under power cables equal to the distance between adjacent cables.

**Submarine cable areas** are shown on the charts but are not described in the Coast Pilots. Special effort should be made to avoid anchoring or trawling in cable areas. If a vessel does foul a cable, extreme care should be used when attempting to clear. Should normal methods fail, the anchor or other gear should be slipped and abandoned rather than risk breaking or cutting the cable. The high voltages in certain cables could cause severe burn or loss of life.

**Tide Tables** are issued annually by the Coast and Geodetic Survey in advance of the year for which they are prepared. These tables include predicted times and heights of high and low waters for every day in the year for a number of reference stations and differences for obtaining similar predictions for numerous other places. They also include other useful information such as a method for obtaining heights of tide at any time, local mean time of sunrise and sunset for various latitudes, reduction of local mean time to standard time, and time of moonrise and moonset for various ports.

**Caution.**—In using the Tide Tables, slack water should not be confused with high or low water. For ocean stations there is usually little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, land-locked harbors, or on tidal rivers, the time of slack current may differ by several hours from the time of high or low water. The relation of the times of high or low water to the turning of the current depends upon a number of factors, so that no simple general rule can be given. To obtain the times of slack water, reference should be made to the Tidal Current Tables.

**Tidal Current Tables** for the coasts of the United States are issued annually by the Coast and Geodetic Survey

in advance of the year for which they are prepared. These tables include daily predictions of the times of slack water and the times and velocities of strength of flood and ebb currents for a number of waterways, together with differences for obtaining predictions for numerous other places. Also included is other useful information such as a method for obtaining the velocity of current at any time, duration of slack, coastal tidal currents, wind currents, combination of currents, and current diagrams. Some information on the Gulf Stream is included in the tables for the Atlantic coast.

**Tidal Current Charts** are published by the Coast and Geodetic Survey for various localities. These charts depict the direction and velocity of the current for each hour of the tidal cycle. They present a comprehensive view of the tidal current movement in the respective waterways as a whole and when used with the proper current tables or tide tables supply a means for readily determining for any time the direction and velocity of the current at various localities throughout the areas covered.

The **COAST GUARD** has among its duties the enforcement of the laws of the United States on the high seas and in coastal and inland waters of the U.S. and its possessions; enforcement of navigation and neutrality laws and regulations and the Oil Pollution Act; inspection of vessels of the Merchant Marine; search and rescue; issuance of Merchant Marine licenses and documents; investigation of marine casualties and accidents, and suspension and revocation proceedings; destruction of derelicts; operation of aids to navigation, and publication of Light Lists and Local Notices to Mariners; and operation of ice breaking facilities.

**Protection of navigable waters.**—United States laws prohibit discharge from any vessel or shore establishment of any refuse matter, other than that flowing from streets and sewers in a liquid state, into any navigable water. It is not lawful to tie up or anchor vessels or to float log rafts in navigable channels in such manner as to obstruct normal navigation. When a vessel or raft is wrecked and sunk in a navigable channel it is the duty of the owner to immediately mark it with a buoy or beacon during the day and a light at night until the sunken craft is removed or abandoned. It is unlawful, except in emergency or by special permit, to discharge oil into coastal navigable waters from any vessel.

**Light Lists.**—Aids to navigation, consisting of lights, fog signals, buoys, lightships, daybeacons, and electronic aids, are described in the Light Lists, which are for sale by the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, and by sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the characteristics and visibility of lights, and the descriptions of light structures, lightships, buoys, fog signals, and electronic aids.

**Local Notices to Mariners.**—Changes and deficiencies in aids to navigation maintained by or under the author-

ity of the Coast Guard are published in Local Notices to Mariners issued by the District Commander of the area in which the aids are located. The local notices are intended for local navigation interests operating within the limits of a Coast Guard district. Changes in aids to navigation of the United States are also contained in the weekly **Notice to Mariners**. The weekly notices are intended for mariners and others who have a definite need for them in connection with extended sea-going activities or for those operating in several Coast Guard districts.

**Reporting of defects in aids to navigation.**—Promptly notify the nearest Coast Guard District Commander if an aid to navigation is observed to be missing, sunk, capsized, out of position, damaged, extinguished, or showing improper characteristics.

Radio messages should be prefixed "Coast Guard" and transmitted directly to any U.S. Government shore radio station for relay to the Coast Guard District Commander. If the radio call sign of the nearest U.S. Government radio shore station is not known, radiotelegraph communication may be established by the use of the general call "NCG" on the frequency of 500 kc. Merchant ships may send messages relating to defects noted in aids to navigation through commercial facilities only when they are unable to contact a U.S. Government shore radio station. Charges for these messages will be accepted "collect" by the Coast Guard.

**Lights.**—The visibility of lights is given in the Light Lists and shown on the charts. The distances may at times be increased by abnormal atmospheric refraction and may be greatly decreased by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions. In some conditions of the atmosphere white lights may have a reddish hue.

Navigational lights should be used with caution because of the following conditions that may exist:

A light may be extinguished and the fact not reported to the Coast Guard for correction, or a light may be located in an isolated area where it will take time to correct.

In regions where ice conditions prevail the lantern panes of unattended lights may become covered with ice or snow, which will greatly reduce the visibility and may also cause colored lights to appear white.

Brilliant shore lights used for advertising and other purposes, particularly those in densely populated areas, make it difficult to identify a navigational light.

At short distances flashing lights may show a faint continuous light between flashes.

The distance of an observer from a light cannot be estimated by its apparent intensity. The characteristics of lights in an area should always be checked in order that powerful lights visible in the distance will not be mistaken for nearby lights showing similar characteristics at low intensity such as those on lighted buoys.

The apparent characteristic of a complex light may change with the distance of the observer. The charac-

teristic as charted and shown in the light list may not be recognized until nearer the light.

Motion of a vessel in a heavy sea may cause a light to alternately appear and disappear, and thus give a false characteristic.

Where lights have different colored sectors, be guided by the correct bearing of the light; do not rely on being able to accurately observe the point at which the color changes. On either side of the line of demarcation of colored sectors there is always a small arc of uncertain color.

Arcs drawn on charts around a light show the bearings between which the variation of visibility or obscuration occurs and do not indicate the distance at which it can be seen. On some bearings the distance may be reduced or increased by land or other obstructions, depending on the distance from the light.

Lights should not be passed close aboard because in many cases rip-rap mounds are maintained to protect the structures against ice damage and scouring action.

**Fog signals.**—Caution should be exercised in the use of sound fog signals for navigation purposes. They should be considered solely as warning devices.

Sound travels through the air in a variable manner with or without the effects of wind and, therefore, the hearing of fog signals cannot be implicitly relied upon. Experience indicates that distances must not be judged only by the intensity of the sound; that occasionally there may be areas close to a fog signal in which it is not heard; and that fog may exist not far from a station, yet not be seen from it, so the signal may not be operating. It is not always possible to start a fog signal immediately when fog is observed.

**Lightships.**—Courses should invariably be set to pass lightships with sufficient clearance to avoid the possibility of collision from errors of observation, current and wind effects, other vessels in the vicinity, defect in steering apparatus, and from other causes. Experience shows that lightships cannot be safely used as leading marks to be passed close aboard, but should always be left broad off the course, whenever searoom permits.

During extremely heavy weather and due to their exposed locations, lightships may be carried off station without the knowledge and despite the best efforts of their crews. A lightship known to be off station will secure her light, fog signal, and radiobeacon and fly the International Code signal "PC" signifying "Lightship is not at anchor on her station."

Station (watch) buoys are sometimes moored near lightships to mark the approximate station should the lightship be carried away or temporarily removed. Since these buoys are always unlighted and, in some cases, moored as much as a mile from the lightship, the danger of a closely-passing vessel colliding with them is always present, particularly so during darkness or periods of reduced visibility.

**Buoys.**—The navigator should check the position by shore bearings, soundings, or other means, and not rely

entirely on a buoy being on its charted position and showing its proper characteristic. Buoys are liable to be carried away, shifted, capsized, or sunk as a result of storms, ice conditions, collision, or other accident. Lighted buoys may become extinguished or show improper characteristics, or sound buoys may not function because of storm, ice, or collision.

Buoys may not always properly mark shoals or other obstructions due to shifting shoals and storms. Buoys marking wrecks or other obstructions are usually placed on the seaward or channelward side and not directly over a wreck. Since buoys may be located some distance from a wreck they are intended to mark because of local conditions, and since sunken wrecks are not always static, extreme caution should be exercised when operating in the vicinity of such buoys.

**Radiobeacons.**—A list and descriptive details of all marine radiobeacons are given in the Light Lists. There is included in these publications the procedure to follow for the use of radiobeacons for calibration of radio direction-finders as well as a list of special radio direction-finder calibration stations.

A vessel steering a course for a radiobeacon should observe the same precautions as when steering for a light or any other mark. If the radiobeacon is aboard a lightship, particular care should be exercised to avoid the possibility of collision, and sole reliance should never be placed on sighting the lightship or hearing its fog signal. If there are no dependable means by which the vessel's position may be fixed and the course changed well before reaching the lightship, a course should be selected that will insure passing the lightship at a distance, rather than close aboard, and repeated bearings of the radiobeacon should show an increasing change in the same direction.

**Radio bearings.**—No exact data can be given as to the accuracy to be expected in radio bearings taken by a ship, since the accuracy depends to a large extent upon the skill of the ship's operator, the condition of the ship's equipment, and the accuracy of the ship's calibration curve. Mariners are urged to obtain this information for themselves by taking frequent radio bearings, when their ship's position is accurately known, and recording the results. Bearings of aircraft ranges and standard broadcast stations should be used with particular caution due to coastal refraction and lack of calibration of their frequencies.

**Conversion of radio bearings to Mercator bearings.**—Radio directional bearings are the bearings of the great circles passing through the radio stations and the ship, and, unless in the plane of the Equator or a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is, the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

A table of corrections is given in the appendix for the conversion of a radio bearing into a Mercator bearing.

It is sufficiently accurate for practical purposes for distances up to 1,000 miles.

The only data required are the latitudes and longitudes of the radiobeacons and of the ship by dead reckoning. The latter is scaled from the chart, and the former is either scaled from the chart or taken from the list of radiobeacons in the Light List.

The table is entered with the differences of longitude in degrees between the ship and station (the nearest tabulated value being used), and opposite the middle latitude between the ship and station, the correction to be applied is read.

The sign of the correction (bearings read clockwise from the north) will be as follows: In north latitude, the minus sign is used when the ship is east of the radiobeacon and the plus sign used when the ship is west of the radiobeacon. In south latitude, the plus sign is used when the ship is east of the radiobeacon, and the minus sign is used when the ship is west of the radiobeacon.

To facilitate plotting, 180 degrees should be added to or subtracted from the corrected bearing, and the result plotted from the radiobeacon.

Should the position by dead reckoning differ greatly from the true position of the ship as determined by plotting the corrected bearings, retrial should be made, using the new value as the position of the ship.

**Radio bearings from other vessels.**—Any vessel with a radio direction-finder can take a bearing on a vessel equipped with a radio transmitter. These bearings, however, should be used only as a check, as comparatively large errors may be introduced by local conditions surrounding the radio direction-finder unless known and accounted for. Although any radio station, for which an accurate position is definitely known, may serve as a radiobeacon for vessels equipped with a radio direction-finder, extreme caution must be exercised in their use. Stations established especially for maritime services are more reliable.

**Loran.**—A list of stations and descriptive details of the Loran System are given in the Light Lists. Instructions, tables, and charts of the Loran System are published by the Naval Oceanographic Office. The Coast and Geodetic Survey shows Loran lines on general charts of the United States coasts.

Exact data cannot be given as to the accuracy to be expected in Loran positions since the accuracy depends to a large extent on the skill of the operator, the condition and type of receiving equipment, and the area of operation. The accuracy of a Loran fix is determined by the accuracy of the individual lines of position used to establish the fix and by their angle of intersection.

Loran position determinations on or near the baseline extensions are subject to geometric errors exceeding two nautical miles per microsecond and, therefore, should be avoided whenever possible. Loran is a long-range aid to navigation and should not normally be used in pilot waters. The use of skywaves is not recommended within 250 miles of either station.

Caution must be used in matching Loran signals to insure that the ground wave signal of one station is not unknowingly matched with a skywave signal of the other station of the pair, or a one-hop skywave signal from station with a two-hop skywave signal from the other.

**Numbering and recording of undocumented vessels.**—Certain undocumented vessels are required to be numbered by the Federal Boating Act of 1958, effective April 1, 1960. They may be numbered either by the Coast Guard or by a state having an approved numbering system. Owners may obtain the necessary information from any Coast Guard District Commander.

**Licensing of vessels.**—Navigation laws pertaining to registry, enrollment, and licensing of vessels are administered by the **Bureau of Customs**. The bureau's functions also include issuing of commissions to yachts and the assignment of signal letters; the measurement of vessels, administration of tonnage duties, and the collection of tolls; the regulation of vessels in the coasting and fishing trade and limitation of the use of foreign vessels in waters under the jurisdiction of the United States; the recording of sales, conveyances, and mortgages of vessels; the protection of steerage passengers, and the remission of fines, penalties, and the forfeitures incurred under the laws governing these matters. Collection districts and ports of entry located within the area covered by this Coast Pilot are tabulated in the appendix.

**Danger signal.**—It is stated in the **Pilot Rules for Inland Waters**, § 80.1, if, when steam vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle, the danger signal. Article 18, Rule III, of the **Inland Rules of the Road** also contains this provision. The **International Rules of the Road**, Part D, Rule 28(b), states, in part, that, whenever a power driven vessel which, under these Rules is to keep her course and speed, is in sight of another vessel and is in doubt whether sufficient action is being taken by the other vessel to avert collision, she may indicate such doubt by giving at least five short and rapid blasts on the whistle.

**Minesweeper signals.**—U.S. vessels engaged in minesweeping operations or exercises are hampered to a considerable extent in their maneuvering powers. With a view to indicating the nature of the work on which they are engaged, these vessels will show the signals hereinafter mentioned. For the public safety, all other vessels, whether steamers or sailing craft, must endeavor to keep out of the way of vessels displaying these signals and not approach them inside the distances mentioned herein, especially remembering that it is dangerous to pass between the vessels of a pair or group sweeping together.

All vessels towing sweeps are to show: **By Day**, a black ball at the fore truck and a black ball at the fore yard on the side or sides on which it is dangerous to pass; there may be thus 2 or 3 black balls displayed;

**By night**, all around green lights instead of the black balls, and in a similar manner.

Vessels or formations showing these signals are not to be approached nearer than 1,500 feet on either beam and vessels are not to cross astern closer than 3,000 feet. Under no circumstances is a vessel to pass through a formation of minesweepers. Minesweepers should be prepared to warn merchant vessels which persist in approaching too close by means of any of the appropriate signals from the International Code of Signals. In fog, mist, falling snow, heavy rainstorms, or any other condition similarly restricting visibility, whether by day or night, minesweepers while towing sweeps when in the vicinity of other vessels will sound whistle signals for a vessel towing (1 prolonged blast followed by 2 short blasts).

**Improper use of searchlights prohibited.**—No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilot-house of any vessel under way (46 CFR 78.27-1(a)). The International Code Signal "ZO" may be made by a vessel inconvenienced by the glare of a searchlight in order to apprise the offending vessel of the fact.

**Unnecessary whistling prohibited.**—The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States (46 CFR 78.23-1(a)).

**Search and rescue operations.**—The Coast Guard coordinates search and rescue operations in the cases of surface vessels or aircraft that are in distress or overdue. Search and rescue planes have special markings consisting of a wide band of fluorescent red orange around the after part of the fuselage or hull. The cooperation of vessel operators with search and rescue planes may mean the difference between life and death for some seaman or aviator.

Operators of disabled wooden craft and persons adrift in rubber rafts or boats that are, or may consider themselves to be, the object of a search, should hoist on a halyard or otherwise place aloft as high as possible any metallic object that would assist their detection by radar. Coast Guard cutters and aircraft are radar equipped and thus are able to continue searching in darkness and during other periods of low visibility.

**Aircraft procedures for directing surface craft to scene of distress incident.**—The following procedures performed in sequence by an aircraft mean that the aircraft is directing a surface craft toward the scene of a distress incident:

(a) Circling the surface craft at least once.

(b) Crossing the projected course of the surface craft close ahead at low altitude, opening and closing the throttle, or changing the propeller pitch.

(c) Heading in the direction in which the surface craft is to be directed. The surface craft should acknowledge the signal by changing course and following the aircraft. If, for any reason, it is impossible to follow, the surface craft should hoist the international code flag NOVEMBER, or use any other signaling means available to indicate this.

The following procedures performed by an aircraft mean that the assistance of the surface craft is no longer required:

(a) Crossing the wake of the surface craft close astern at a low altitude opening and closing the throttle or changing the propeller pitch.

**Note.**—The above procedures are taken from the Convention on International Civil Aviation.

**Merchant vessel procedures for assisting an aircraft that must ditch.**—The following are recommended procedures for assisting an aircraft that desires to ditch alongside:

**By day:** 1. Establish a radiotelephone watch on 2182 kc if equipped. Attempt to contact the aircraft on this frequency.

2. Maintain a radiotelegraphy watch on 500 kc. The Rescue Coordination Center controlling the case will try to contact the ship on this frequency via a shore radio station. Communications with the aircraft may have to be relayed in this manner.

3. Be prepared to send homing signals for the aircraft on 410 kc or 522 kc.

4. Provide black smoke if possible to aid aircraft in sighting the ship.

5. Post extra lookouts.

6. Prepare to stop vessel or proceed towards plane according to circumstances.

7. Have two lifeboats and lifeboat crews ready. Include in each lifeboat two ring buoys with buoyant heaving lines, and fire extinguishers.

8. Have medicine chest, stretchers, blankets, hot drinks and food ready.

9. Have ship's hospital prepared to receive injured persons.

10. Rig Jacobs ladders. Rig cargo net or rope mail sling on lee side amidships by cargo boom, to be used if necessary to heave up exhausted survivors. Injured persons should be left in the lifeboat to be hoisted aboard with it.

11. Be prepared to give aircraft information on weather and sea conditions. Aircraft will want to know wind direction and force; direction, height, and length of primary and secondary swell systems. If pilot selects ditch heading in sufficient time and conditions otherwise permit, lay foam path along ditching course.

12. When aircraft is in sight set course parallel to ditch heading that pilot has chosen. If not in communication with the aircraft by the time the plane is sighted and unable to obtain pilot's ditch heading, set course parallel to the main swell system and into the wind component, if any.

13. If on board, use a liferaft or buoyant apparatus in water as a landing platform at the Jacobs ladder.

14. Instruct coxswains to recover those survivors in the water or clinging to wreckage before recovering those in liferafts.

15. Keep the Rescue Coordination Center advised by radio, prior to, and subsequent to ditching.

**By night.**—In addition to procedures recommended for daytime, the following are also recommended if the emergency occurs at night:

1. Lay a string of not less than 6 ring buoys with water lights approximately 500 feet apart in a single line along the ditch heading received from the pilot. Take station two-thirds down the lighted lane off to one side. The aircraft will attempt to land close to the lighted lane. Do not use carbide water lights because of the danger of gasoline on the water.

2. Light up the ship with all fixed deck lights and rig cargo lights on masts, king posts, top of decks, etc., if possible.

3. Use searchlights as visual beacons, shining one vertically and sweeping the sky at 15° off the horizon with the other. Do not shine lights toward the aircraft at any time, since this would blind the pilot.

**Ships in distress.**—Radio-equipped vessels requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency 500 kc to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "COGARD." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and numbers of vessels and aircraft required to render adequate aid, thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance:

1. Name, type, and nationality of vessel; color, size and shape.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea and wind. Action taken, if any.
4. Number of persons on board.
5. State whether or not Coast Guard assistance is required.

**Small craft in distress.**—Under the provision of the international regulations, which permits the use of any means available to a vessel or aircraft in distress to draw attention and obtain help, small commercial and private craft equipped with radiotelegraph or radiotelephone apparatus that cannot be operated on the international distress frequency of 500 kc (600 m.) may usually obtain Coast Guard assistance by transmitting the distress signal or call and the message on the 2182 kc frequency.

**Submarine emergency identification signals.**—The following flare signals, fired from a submerged signal ejector to 300 feet in the air, are made by United States submarines when in emergency:

**Green or black** indicates torpedo has been fired; will be used to simulate torpedo firing on special exercises such as convoy exercises.

**Yellow** indicates the submarine is about to rise to periscope depth. Surface craft terminate antisubmarine counterattack and clear vicinity of submarine. Do not stop propellers.

**Red** indicates an emergency inside the submarine; she will try to surface immediately. Surface ships clear the area and stand by to assist. In case of repeated red signals, or if the submarine fails to surface in a reasonable time, she may be presumed disabled. Buoy the location, look for submarine buoy, and attempt to establish sonar communications. Advise U.S. Naval authorities.

Submarine marker buoys consist of 2 spheres 3 feet in diameter with connecting structure, painted international orange. The buoy has a wire cable to the submarine, to act as a downhaul line for a rescue chamber. The buoy may be accompanied by an oil slick release to attract attention. A submarine on the bottom in distress may release this buoy. If sighted, such a buoy should be investigated and reported immediately to Naval authorities.

The submarine may transmit the International Distress Signal (SOS) on its sonar gear independently or in addition to the red signal. Submarines also may use these other means of attracting attention: release of dye marker or air bubble; ejection of oil, and pounding on hull.

The **CORPS OF ENGINEERS**, U.S. Army, has charge of the improvement of the rivers and harbors of the United States and of miscellaneous other civil works which include the administration of the Federal laws enacted for the protection and preservation of navigable waters of the United States, the establishment of regulations for the use, administration, and navigation of navigable waters, the approval of plans of bridges, the alteration of obstructive bridges, the establishment of anchorage grounds and harbor lines, the removal of sunken vessels obstructing or endangering navigation, and the granting of permits for structures or operations in navigable waters.

Information concerning the various ports, improvements, channel depths, navigable waters, and the condition of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer offices; see appendix.

**Anchorage areas and restricted areas** in most places are defined and regulations governing them are established by the Corps of Engineers. The regulations are enforced by the U.S. Coast Guard, and the areas are shown on the large-scale charts of the Coast and Geodetic Survey. Copies of the regulations may be obtained at the offices of the Corps of Engineers. The regulations also are copied into the appropriate Coast Pilots.

**Fishtraps.**—The Corps of Engineers has general supervision of location, construction, and manner of maintenance of all traps, weirs, pounds, or other fishing structures in the navigable waters of the United States. Construction permits issued by the Engineers specify the lights and signals required for safety of navigation.

**Fish havens.**—These are artificial fishing reefs established in United States coastal waters to simulate the legitimate reefs and wrecks that attract fish. The Corps of Engineers issues permits to various interests, usually sport fishermen, to dump assorted junk ranging from old trolley cars to scrap building material in specified areas which may be of very small extent or may stretch many miles along a depth contour; old automobile bodies appear to be the favorite material of the reef builders. These underwater junk piles may rise only a few feet or as much as 10 feet (according to permit) above natural bottom, but the reef-builder's adherence to permit specifications can only be checked with a wire drag. Navigators should be cautious about passing over these artificial obstructions or anchoring in their vicinity.

**WEATHER BUREAU.**—Forecasts and warnings of the approach of storms over land and ocean areas are among the services of the Weather Bureau to navigation, commerce, agriculture, and the general public. Other warnings cover cold waves, frost, forest-fire hazard, and floods. Meteorological information is collected and transmitted at 1-hour, 3-hour, and 6-hour intervals from land stations, ships at sea, and aircraft. These reports form a basis for the forecasting service, for summarization and publication of climatological data having general value and applicability, and for research basic to improvement of the national weather service.

Weather Bureau offices are in many ports and other places in the United States and possessions. Stations in the area of concern to this Coast Pilot, where the public may compare barometers against Weather Bureau barometers and discuss weather information with bureau officials, are listed in the appendix. By international agreement, the Weather Bureau also shares in the operation of certain weather ships in the North Atlantic and North Pacific Oceans.

**Marine meteorological service.**—The collection of observations from ships at sea is conducted on a purely voluntary and cooperative basis. The Weather Bureau supplies shipmasters with blank forms, printed instructions, and such other materials as is essential to the making and recording of observations. In the course of an average peacetime year, more than 400,000 observations are received from vessels representing every maritime nation and reaching every quarter of the globe.

The **hurricane and storm warning service** was established primarily to aid marine interests. Storm warnings are prepared at regular district forecast centers and at special hurricane forecast centers. The warnings are distributed to the public through all neighboring Weather Bureau offices by radio, the press, and every other available means. During the West Indian hurricane season, June to November, inclusive, teletype circuits expedite the exchange of reports from the Atlantic and Gulf coasts; special reports are obtained from weather reconnaissance planes which fly near the storms and sometime into the storm centers.

**Hurricane watch.**—An announcement is issued by the Weather Bureau to the public and all other interests via press, radio, and television whenever a tropical storm or hurricane becomes a threat to a coastal area. The “hurricane watch” announcement is not a warning; it indicates that the hurricane is near enough that everyone in the “watch” area should listen for subsequent advisories and be ready to take precautionary action in case hurricane warnings are issued.

**Storm warning displays.**—The Weather Bureau employs the following system for displaying warning signals at stations along the United States coast, except Alaska, but including the Great Lakes and Puerto Rico, when winds dangerous to navigation are forecast.

**Small-craft warning:** One red pennant displayed by day and a red light above a white light at night to indicate that winds up to 33 knots and/or sea conditions dangerous to small craft operations are forecast for the area.

**Gale warning:** Two red pennants displayed by day and a white light above a red light at night to indicate that winds ranging from 34 to 47 knots are forecast for the area.

**Whole gale warning:** A single square red flag with black center displayed by day and two red lights at night to indicate that winds ranging from 48 to 63 knots are forecast for the area.

**Hurricane warning:** Two square red flags with black centers displayed by day and a white light between two red lights at night to indicate that winds of 64 knots and above are forecast for the area.

The **NAVAL OCEANOGRAPHIC OFFICE** is required to provide accurate nautical charts and related information for foreign waters. Publications include Sailing Directions (pilots), Light Lists, Table of Distances, Radio Navigational Aids, Radio Weather Aids, International Code of Signals, and the American Practical Navigator (Bowditch). The weekly Notice to Mariners, a joint arrangement with the Coast Guard and the Coast and Geodetic Survey, contains corrections to charts and publications for both foreign and domestic waters; see appendix for coverage.

The **IMMIGRATION AND NATURALIZATION SERVICE** administers the laws relating to admission, exclusion, and deportation of aliens, the registration and fingerprinting of aliens, and the naturalization of aliens lawfully resident in the United States.

The designated ports of entry for aliens are divided into three classes. Class A is for all aliens. Class B is only for aliens who at the time of applying for admission are lawfully in possession of valid resident aliens' border-crossing identification cards or valid non-resident aliens' border-crossing identification cards or are admissible without documents under the documentary waivers contained in 8 CFR 212.1(a). Class C is only for aliens who are arriving in the United States as crewmen as that term

is defined in Section 101(a)(10) of the Immigration and Nationality Act. [The term “crewman” means a person serving in any capacity on board a vessel or aircraft.] No alien may enter the United States until he has been inspected by an immigration officer. A list of the ports of entry for aliens is given in the appendix.

The **PUBLIC HEALTH SERVICE** administers hospitalization and outpatient treatment to legal beneficiaries of the Government; it also administers foreign and domestic quarantine laws and conducts medical examinations of aliens.

**Quarantine.**—A vessel arriving at a port under the control of the United States shall undergo quarantine inspection prior to entry unless exempted from such inspection by section 71.46 or 71.47 of Foreign Quarantine Regulations (42 CFR Part 71), and Supplemental Provisions, of the Public Health Service, Department of Health, Education, and Welfare.

Vessels subject to quarantine inspection shall upon arrival at ports under the control of the United States fly a yellow flag, and await inspection, as provided in section 71.62 of Foreign Quarantine Regulations. Only the pilot shall board or be permitted to board any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer. A person boarding such vessel shall be subject to the same restrictions as those imposed on the persons on the vessel. No person shall leave or be permitted to leave any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer.

**Sanitary inspection.**—Vessels arriving at a port under the control of the United States from a foreign port shall be subject to sanitary inspection to ascertain whether there exists rodent, insect, or other vermin infestation, contaminated food or water, or other insanitary condition requiring measures for the prevention of the introduction, transmission, or spread of communicable disease.

National quarantine regulations will be found at the stations of the Public Health Service and at United States consulates and will be furnished to vessels upon application to officers of the Service or to Chief, Division of Foreign Quarantine, Public Health Service, DHEW, Washington, D.C., 20201.

**Medical service.**—United States merchant seamen are entitled to medical relief obtainable through the Public Health Service. A United States seaman is one engaged on board in care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service, on board, of those so engaged. Hospitals, outpatient clinics, and outpatient offices of the Public Health Service are located at the addresses given in the appendix. Free medical advice is furnished to seamen by radio.

**RADIO.**—The Federal Communications Commission controls radio communications in the United States and in all possessions except the Panama Canal Zone. Commission inspectors have authority to board ships to determine whether their radio stations comply with international treaties, Federal laws and Commission regulations. The commission has field offices in the principal United States ports. Information concerning ship radio regulations and service documents may be obtained from the Federal Communications Commission, Washington, D.C., 20554, or from any of the field offices.

**Marine weather broadcasts.**—Information on weather over North Atlantic and North Pacific waters is issued by the Weather Bureau for broadcast by commercial and Government radio stations. Marine bulletins for the western North Atlantic are broadcast by Navy station NSS, Washington, D.C.; those for the eastern North Pacific are transmitted by KPH, Bolinas, Calif., and KTK, San Francisco, Calif. A separate bulletin for Central Pacific waters is broadcast by KHK, Kahuku, Hawaii. The marine bulletins include storm advisories, forecasts, and coded weather-map analyses and reports. Station frequencies, broadcast times, and areas affected are stated in the radio publications; see appendix.

Advisories and forecasts also are broadcast by Navy stations NBA, Balboa, C.Z.; NPG, San Francisco, Calif.; NHB, Kodiak, Alaska; and NPM, Honolulu, Hawaii.

**Local weather bulletins,** containing coastal-area forecasts, storm advisories, and weather summaries for specific areas, are broadcast on regular schedules by many Government and commercial radio stations.

**Emergency broadcasts by Navy radio stations.**—Storm advisories and notices concerning the safety of navigation at sea are broadcast by Navy radio stations in accordance with the degree of urgency, as follows:

A. Notices of tidal waves, hurricanes, typhoons, and cyclones so imminent as to warrant immediate broadcasting: (1) One transmission immediately on receipt; (2) one transmission at the end of the first ensuing silent period; and (3) one transmission during the first ensuing on-watch period for ships with one operator, in case both previous transmissions were made during the off-watch period.

B. Storm warnings and notices of less urgency than those specified in (A) and other than those normally included in scheduled hydrographic broadcasts: (1) One transmission at the end of the first ensuing silent period; and (2) one transmission during the on-watch period for ships with one operator in case the previous transmission was made during an off-watch period.

These broadcasts are preceded by transmission of the Urgent Signal (XXX) or the Safety Signal (TTT) and a preliminary announcement on 500 kc of the message to follow on the station working frequency.

**Emergency broadcasts by Coast Guard radio stations.**—Storm and hurricane warnings, advisories and other urgent marine information are broadcast by Coast Guard radio stations. See appendix for details.

**Radiotelephone broadcasts of weather information (United States).**—Transmission by voice of weather information from the Weather Bureau is made through certain radio stations of the Coast Guard and of the commercial coastal radiotelephone service. These broadcasts are followed immediately by reports of dangerous obstructions and changes in aids to navigation.

This service gives to yachts, fishing craft, tugboats, and other vessels equipped with a radio receiving set having a band covering the frequency range of 2 to 3 megacycles, official weather information from the Weather Bureau in plain language and on regular schedules.

These radiotelephone broadcasts are made twice and, in some cases, four times daily at definite times and include marine forecasts, and storm warnings whenever they are issued, for coastal waters in or adjacent to the areas served by the radio stations.

Certain local radio stations in the standard broadcast band have microphones installed in nearby Weather Bureau offices. From these stations forecasts, weather summaries, and warnings are broadcast on regular schedule. Stations in this area are listed in the annual Weather Bureau Coastal Warning Facilities Charts.

**West Indies.**—Coast Guard station NMR, San Juan, P.R., broadcasts twice daily by radiotelephone and radiotelegraph a weather bulletin consisting of marine forecasts and weather summary for the Caribbean Sea area and small-craft, storm, and hurricane warnings when applicable.

**Mexico and Canada.**—Scheduled broadcasts of weather information affecting the coasts of Mexico and Canada are made by designated stations of those countries on marine frequencies by both radiotelegraph and radiotelephone.

**Reports from ships.**—The master of every ship of the United States equipped with radio transmitting apparatus, on meeting with a tropical storm, dangerous ice, sub-freezing air temperatures with gale force winds causing severe ice accretion on superstructures, derelict, or any other direct danger to navigation, is required to cause to be transmitted a report of these dangers to ships in the vicinity and to the appropriate Government agencies.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Caribbean Sea area, southern North Atlantic Ocean, and the Pacific waters west of Central America and Mexico are urged to cooperate with the Weather Bureau in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

**TIME SIGNALS.**—The United States system of broadcasting time signals begins at 55 minutes 0 second of some hour and continues for 5 minutes. Signals are transmitted on every second of this period except the 29th of each minute, the 51st of the first minute, the 52d of the second minute, the 53d of the third minute, the 54th of the fourth minute, the last 4 seconds of the first 4 minutes, and the last 9 seconds of the last minute. The

hour signal is a 1.3-second dash, which is much longer than the others.

In all cases the beginnings of the dashes indicate the beginnings of the seconds, and the ends of the dashes are without significance. The number of dashes sounded in the group at the end of any minute indicates the number of minutes of the signal yet to be sent. In case of signal failure or error, the signal is repeated 1 hour later.

The **National Bureau of Standards** broadcasts time signals from its radio station **WWV** near Washington, D.C., on radio frequencies of 2.5, 5, 10, 15, 20, and 25 megacycles, which are on the air at all times, day and night. This insures reliable coverage of the United States and extensive coverage of other parts of the world. The services include time announcements, standard time intervals, standard audio frequencies, and radio-propagation disturbance-warning notices.

**Time announcements.**—The audio frequencies are interrupted at precisely 2 minutes before each hour. They are resumed precisely on the hour and each 5 minutes thereafter. The beginnings of the periods, when the audio frequencies are resumed, are in agreement with the basic service of the U.S. Naval Observatory, and accordingly they accurately mark the hour and successive 5-minute periods.

Greenwich Mean Time is announced in telegraphic code each 5 minutes. The zero- to 24-hour system is used. This announcement refers to the end of the announcement interval. A voice announcement of eastern standard time is given following each telegraphic code announcement.

**Standard time intervals.**—On each carrier frequency is a pulse which occurs at intervals of precisely 1 second. The pulse is omitted at the beginning of the last second of every minute. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the second pulses, are marked by the beginning or ending of the periods when the audio frequencies are off.

A **radio-propagation disturbance warning forecast** is transmitted in Morse code twice each hour at 19½ and 49½ minutes past the hour. These warnings tell users of radio transmission paths over the North Atlantic, the condition of the ionosphere at the time of the announcement, and how good or bad communication conditions are expected to be for the next 12 hours. During a period of radio-propagation disturbance, direction-finder observations may be unreliable; the letters "N", "U", and "W" signify that radio propagation conditions are, respectively, normal, unsettled, or disturbed.

Radio station **WWVH**, on the island of Maui, Hawaii, broadcasts on 5, 10, and 15 megacycles. The schedule of broadcasts is the same as that of station **WWV** for standard time intervals, time announcements in code, standard audio frequencies, and accuracy. Simultaneous reception of **WWV** and **WWVH** does not interfere with ordinary use of the standard frequency and time signals.

The **WWVH** broadcast is interrupted for 4 minutes following each hour and half hour and for periods of 34 minutes each day beginning at 1900 GMT.

**DESTRUCTIVE WAVES.**—Unusual sudden changes in water level can be caused by seismic sea waves or violent storms. These two types of destructive waves have become commonly known as **tidal waves**, a name which is technically incorrect as they are not the result of tide-producing forces.

**Seismic sea waves** are set up by submarine earthquakes. Many such seismic disturbances do not produce sea waves and often those produced are small, but the occasional large waves can be very damaging to shore installations and dangerous to ships in harbors.

These waves travel great distances and can cause tremendous damage on coasts far from their source. The wave of April 1, 1946, which originated in the Aleutian Trench, demolished nearby Scotch Cap Lighthouse and caused damages of \$25 million in the Hawaiian Islands 2,000 miles away. The wave of May 22-23, 1960, which originated off southern Chile, caused widespread death and destruction in islands and countries throughout the Pacific.

The speed of seismic sea waves varies with the depth of the water, reaching 300 to 500 knots in the deep water of the open ocean. In the open sea they cannot be detected from a ship or from the air because their length is so great, sometimes a hundred miles, as compared to their height, which is usually only a few feet. Only on certain types of shelving coasts do they build up into waves of disastrous proportions.

There is usually a series of waves with crests 10 to 40 minutes apart, and the highest may occur several hours after the first wave. Sometimes the first noticeable part of the wave is the trough which causes a recession of the water from shore, and people who have gone out to investigate this unusual exposure of the beach have been engulfed by the oncoming crest. Such an unexplained withdrawal of the sea should be considered as nature's warning of an approaching wave.

Improvements have been made in the quick determination and reporting of earthquake epicenters, but no method has yet been perfected for determining whether a sea wave will result from a given earthquake. The Honolulu Observatory of the Coast and Geodetic Survey is headquarters of a warning system which has field reporting stations (seismic and tidal) in most countries around the Pacific. When a warning is broadcast, waterfront areas should be vacated for higher ground, and ships in the vicinity of land should head for the deep water of the open sea.

**Storm waves.**—A considerable rise or fall in the level of the sea along a particular coast may result from strong winds and a sharp change in barometric pressure. In cases where the water level is raised, higher waves can form with greater depth and the combination can be destructive to low regions, particularly at high stages of tide. Extreme low levels can result in depths which are considerably less than those shown on nautical charts. This type of wave occurs especially in coastal regions

bordering on shallow waters which are subject to tropical storms.

**Seiche** is a stationary vertical wave oscillation with a period varying from a few minutes to an hour or more, but somewhat less than the tidal periods. It is usually attributed to external forces such as strong winds, changes in barometric pressure, swells, or seismic sea waves disturbing the equilibrium of the water surface. Seiche is found both in enclosed bodies of water and superimposed

upon the tides of the open ocean. When, the external forces cause a short-period horizontal oscillation of the water, it is called **surge**.

5 The combined effect of seiche and surge sometimes makes it difficult to maintain a ship in its position alongside a pier even though the water may appear to be completely undisturbed, and heavy mooring lines have been parted repeatedly under such conditions. Pilots advise taut lines to reduce the effect of the surge.

## 2. NAVIGATION REGULATIONS

THIS chapter contains the sections of Code of Federal Regulations, Title 33, Navigation and Navigable Waters, that are of most importance in the areas covered by Coast Pilot 3. The sections are from Part 82, Boundary Lines of Inland Waters; Part 124, Control Over Movement of Vessels; Part 202, Anchorage Regulations; Part 203, Bridge Regulations; Part 204, Danger Zone Regulations; and Part 207, Navigation Regulations.

### PART 82—BOUNDARY LINES OF INLAND WATERS:

#### § 82.1 General basis and purpose of boundary lines.

Under section 2 of the act of February 19, 1895, as amended (28 Stat. 672, 33 U.S.C. 151), the regulations in this part are prescribed to establish the lines dividing the high seas from rivers, harbors, and inland waters in accordance with the intent of the statute and to obtain its correct and uniform administration. The waters in-  
shore of the lines described in this part are "inland waters," and upon them the inland rules and pilot rules made in pursuance thereof apply. The waters outside of the lines described in this part are the high seas and upon them the international rules apply. The regula-  
tions in this part do not apply to the Great Lakes or their connecting and tributary waters.

§ 82.2 General rules for inland waters. At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described in this part, the waters inshore of a line approximately parallel with the general trend of the shore, drawn through the outermost buoy or other aid to navigation of any system of aids, are inland waters, and upon them the inland rules and pilot rules made in pursuance thereof apply, except that Pilot Rules for Western Rivers apply to the Red River of the North, the Mississippi River and its tributaries above Huey P. Long Bridge, and that part of the Atchafalaya River above its junction with the  
Plaquemine-Morgan City alternate waterway.

§ 82.25 Delaware Bay and tributaries. A line drawn from Cape May Inlet East Jetty Light to Cape May Harbor Inlet Lighted Bell Buoy 2CM; thence to South Shoal Lighted Bell Buoy 4; thence to the northernmost ex-  
tremity of Cape Henlopen.

§ 82.30 Chesapeake Bay and tributaries. A line drawn from Cape Henry Light to Cape Henry Junction  
Lighted Whistle Buoy; thence to Cape Charles Light.

### PART 124—CONTROL OVER MOVEMENT OF VESSELS:

§ 124.10 Advance notice of vessel's time of arrival to Captain of the Port. (a) The master or agents of every registered vessel of the United States, and every foreign vessel arriving at a United States port or place from a port or place outside the United States, or any such vessel destined from one port or place in the United States to another port or place in the United States, shall give at least 24 hours advance notice of arrival to the Captain of the Port at every port or place where the vessel is to arrive, except as follows:

(1) Registered United States pleasure vessels and registered United States fishing vessels are not required to submit advance notice of arrival report.

(2) When the port of arrival is not located within the geographical area assigned to a particular Captain of the Port, this advance notice of time of arrival shall be made to the Commander of the Coast Guard District in which such port or place is located.

(3) When the arrival is a direct result of the operation of "force majeure," and it is not possible to give at least 24 hours' advance notice of time of arrival, then advance notice as early as practicable shall be furnished.

(4) When the vessel, while in United States waters, does not navigate any portion of the high sea, i.e. does not navigate beyond the low-water mark along the coasts or beyond the waters contained within the headlands of the United States.

(5) When a vessel is engaged upon a scheduled route if a copy of the schedule is filed with the Captain of the Port for each port of call named in the schedule and the times of arrival at each such port are adhered to.

(6) When the master of a merchant vessel (except on a coastwise voyage of 24 hours or less) reports in accordance with the U.S. Coast Guard's voluntary Automated Merchant Vessel Report (AMVER) System, he shall be considered to be in constructive compliance with the requirements of paragraph (a) of this section and no additional advance notice of vessel's arrival reports to the Captain of the Port is required. The master or agent of a vessel on coastwise voyages of 24 hours or less shall report the advance notice of vessel's arrival to the Captain of the Port at next port of call prior to or upon departure from port.

(7) For that vessel which is engaged in operations in and out of the same port to sea and return without entering any other port, or on coastwise voyages between ports in the same Coast Guard District, or on voyages between

ports in the First, Ninth, Thirteenth, or Seventeenth Coast Guard Districts and adjacent Canadian ports, or between ports of the Commonwealth of Puerto Rico and ports in the Lesser Antilles, or between ports in the Lesser Antilles, or between ports on the east coast of Florida and the Bahama Islands, the Coast Guard District Commander having jurisdiction may, when no reason exists which renders such action prejudicial to the rights and interests of the United States, prescribe conditions under which such vessels may be considered by the Captains of the Port as being in constructive compliance with the requirements of this section.

(8) A westbound vessel which is to proceed to or through United States waters of the St. Lawrence River and/or the Great Lakes shall be subject to compliance with paragraph (b) of this section.

(b) The master or agent of every vessel other than vessels of United States or Canadian nationality engaged in the coastal trade of their respective countries or in trade between their two countries without calling at any other country en route, when proceeding westbound to United States waters of the St. Lawrence River and/or the Great Lakes shall:

(1) At least 24 hours in advance of the vessel's arrival at the Snell Lock, Massena, N.Y., advise the Commander, Ninth Coast Guard District, Cleveland, Ohio, of estimated time of arrival of such vessel at the Snell Lock.

(2) In addition, at least 24 hours in advance of the vessel's arrival at the first United States port-of-call, advise the Commander, Ninth Coast Guard District, Cleveland, Ohio, of the estimated time of arrival at that port.

(3) [Revoked]

(4) A master of a vessel who reports in accordance with the U.S. Coast Guard's voluntary Automated Merchant Vessel Report (AMVER) System and who includes in this report an estimated time of arrival at the Snell Lock, Massena, N.Y., shall be considered to be in constructive compliance with the requirements of subparagraph (1) of this paragraph and no additional advance notice of vessel's arrival at the Snell Lock is required. Likewise a master of such vessel who indicates in this report the name of the first intended United States port of call and estimated time of arrival at that port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

(5) A master or agent of a vessel who files a copy of the scheduled route with the Commander, Ninth Coast Guard District, Cleveland, Ohio, at least 24 hours prior to arrival at Snell Lock, and who includes in the schedule the estimated time of arrival at the Snell Lock, Massena, N.Y., shall be considered to be in constructive compliance with requirements of subparagraph (1) of this paragraph and no additional advance notice of the vessel's arrival at the Snell Lock is required. Likewise, a master or agent of such vessel who indicates in this schedule the name

of the first intended United States port of call and estimated time of arrival at that port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

(6) When the arrival is a direct result of the operation of "force majeure," and it is not possible to give at least 24 hours advance notice of time of arrival, then advance notice as early as practicable shall be furnished.

#### **§ 124.14 Advance notice of arrival of vessel laden with explosives or certain specified dangerous cargoes.**

(a) The master, agent, or person in charge of any domestic or foreign vessel which is bound for a port or place in the United States and which is carrying as cargo any of the dangerous cargoes described in this paragraph, whether for discharge in the United States or not, shall, at least 24 hours in advance of arrival at each port or place, notify the Captain of the Port or the Commander of the Coast Guard District in which such port or place is located concerning the amount and location of stowage on board the vessel of any of the following:

(1) Explosives, Class A (commercial or military).

(2) Oxidizing materials for which a special permit for water transportation is required by 46 CFR 146.22.

(3) Radioactive materials for which a special approval by the Commandant for water transportation is required by 46 CFR 146.25-30.

(b) When the arrival is a direct result of "force majeure," and it is not possible to give at least 24 hours' advance notice, then advance notice as early as possible shall be furnished.

#### **§ 124.16 Advance notice of fire or other abnormal condition on arriving vessel.**

(a) The master, agent, or person in charge of any domestic or foreign vessel which is bound for a port or place in the United States shall give notice to the Captain of the Port or the Commander of the Coast Guard District in which such port or place is located as early as possible in advance of arrival of any fire or other abnormal condition which may jeopardize the vessel's safety or that of other vessels or facilities in port.

**§ 124.20 Penalties for violations.** Failure to give advance notice will subject the master or agents of a vessel to the penalties of fine and imprisonment, as well as subject the vessel to seizure and forfeiture, as provided in section 2, Title II of the Act of June 15, 1917, as amended, 50 U.S.C. 192. In addition, such failure may result in delay in the movement of the vessel from the harbor entrance to her facility destination within the particular port.

### **PART 202—ANCHORAGE REGULATIONS:**

**§ 202.1 General.** (a) The areas described in Subpart A of this part are designated as special anchorage

areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150). Section 1 of the act amended Article 11 of the Navigation Rules for Harbors, Rivers, and Inland Waters Generally (33 U.S.C. 180), section 2 amended Rule 9 of the Navigation Rules for Great Lakes and Their Connecting and Tributary Waters (33 U.S.C. 258), and section 3 amended Rule 10 of the Navigation Rules for Red River of the North and Rivers Emptying into Gulf of Mexico and Tributaries (33 U.S.C. 319). Vessels not more than 65 feet in length, when at anchor in any special anchorage area, shall not be required to carry or exhibit the white anchor lights required by the Navigation Rules.

(b) The anchorage grounds for vessels described in Subpart B of this part are established, and the rules and regulations in relation thereto adopted, pursuant to the authority contained in section 7 of the River and Harbor Act approved March 4, 1915 (38 Stat. 1053; 33 U.S.C. 471).

(c) All bearings in this part are referred to true meridian.

#### Subpart A—Special Anchorage Areas:

§ 202.65 **Indian River Bay, Del.** Beginning at a point bearing 174°, 300 feet, from a point on the southerly edge of the project channel 5,500 feet westerly from the State highway bridge across Indian River Inlet; thence 174°, 600 feet; thence 264°, 800 feet; thence 354°, 600 feet; and thence 84°, 800 feet, to the point of beginning.

§ 202.67 **Delaware River, Essington, Pa.** North of Little Tinicum Island, between the mouth of Darby Creek and Jansen Avenue, Essington, bounded as follows: Beginning at a point (approximately latitude 39°51'31'', longitude 75°17'43'') on a line in prolongation of the westerly line of Jansen Avenue 135 yards southerly from the mean high water line; thence 184°, 300 yards; thence 274°30', 1,700 yards; thence 04°, 425 yards; thence 100°, 1,225 yards; and thence 95°, 490 yards, to the point of beginning.

§ 202.70 **Chesapeake and Delaware Canal, easterly of Courthouse Point, Md.** The waters southerly of a line joining the northernmost extremity of Courthouse Point and the westernmost point of Herring Island; westerly of a line bearing 180° from a point on the aforesaid line 220 yards from the westernmost point of Herring Island; and northerly and easterly of the shore line.

§ 202.72 **Blackhole Creek, Md.** The waters on the west side of Blackhole Creek, a tributary of Magothly River, southwest of a line bearing 310°30' from the most northerly tip of an unnamed island located 0.16 mile upstream from the mouth of the creek approximately 660 feet to the west shore of the creek; northwest of a line ranging from the southwesterly tip of the island toward the point of land on the west shore of the creek immedi-

ately southwest thereof; and north of a line 100 feet from and parallel to the shore of the creek to its intersection with the south property line extended of the Potapskut Sailing Association, Inc., thence northwesterly along the said property line extended to the shore.

#### Subpart B—Anchorage Grounds:

§ 202.157 **Delaware Bay and River.** (a) **The anchorage grounds—(1) Anchorage A (tanker lightering) off the entrance to Mispillion River.** To the southwest of the channel along Brandywine Range, bounded as follows: Beginning at a point at latitude 38°57'42'' N., longitude 75°11'08'' W., bearing 246.5° true 7,400 yards from Brandywine Shoal Light; thence 330°, 5,000 yards; thence 240°, 2,000 yards; thence 150°, 5,000 yards; thence 060°, 2,000 yards, to the point of beginning. This anchorage is intended for the specific purpose of allowing deep-draft tankers to anchor and lighter their cargo before proceeding up the Delaware River. Supervision over the anchoring of vessels in the anchorage area will be exercised by the District Commander or his authorized representative. The provisions of paragraph (b) of this section shall be applicable to the anchoring of vessels in this anchorage, except for subparagraphs (1) and (2).

(2) **Anchorage 1 off Bombay Hook Point.** On the southwest side of the channel along Liston Range, bounded as follows: Beginning at a point (approximately latitude 39°17'59'', longitude 75°23'07'') bearing 228° from Ship John Shoal Light, 167 yards southwest of the southwest edge of the channel along Liston Range; thence 228°, 2,000 yards; thence 318°, 8,000 yards; thence 48°, 2,000 yards; and thence 138°, 8,000 yards to the point of beginning.

(3) **Anchorage 2 (explosives) northwest of Artificial Island.** On the east side of the channel along Reedy Island Range, bounded as follows: Beginning at a point bearing 105° from the northernmost point of Reedy Island, 167 yards easterly of the east edge of the channel along Reedy Island Range; thence 105°, 800 yards; thence 195°, 4,500 yards; thence 285°, 800 yards, to a point (approximately latitude 39°28'58'', longitude 75°33'37'') opposite the intersection of Reedy Island and Baker Ranges; and thence 15°, 4,500 yards, to the point of beginning. This anchorage is intended for vessels engaged in the transportation and handling of explosives and other dangerous articles. No vessel not so engaged will be permitted to anchor in this anchorage except in case of emergency or by special permission of the District Commander. For special regulations relating to this anchorage, see paragraph (c) of this section.

NOTE: The term "District Commander" as used in this section means the Commander, Third Coast Guard District, or his authorized representative.

(4) **Anchorage 3 southeast of Reedy Point.** Southeast of the entrance to the Chesapeake and Delaware Canal at Reedy Point, bounded on the east by the west edge of the channel along Reedy Island and New Castle

Ranges; on the west by a line beginning at a point on the west edge of the channel along Reedy Island Range at latitude  $39^{\circ}31'43''$ , thence to a point bearing  $168^{\circ}30'$ , 3,150 yards, from Chesapeake and Delaware Canal 2 Light, and thence to a point bearing  $131^{\circ}$ , 1,160 yards, from Chesapeake and Delaware Canal 2 Light; and on the north by a line running from the last-described point  $113^{\circ}30'$ , approximately 813 yards, to the west edge of the channel along New Castle Range.

(5) **Anchorage 4 north of Reedy Point.** North of the entrance to the Chesapeake and Delaware Canal at Reedy Point, on the west side of the river, bounded as follows: Beginning at a point (approximately latitude  $39^{\circ}33'51''$ , longitude  $75^{\circ}33'35''$ )  $344^{\circ}58'$  true, 160 yards from Chesapeake and Delaware Canal Light 2; thence  $306^{\circ}26'$ , 1,442 yards; thence  $36^{\circ}26'$ , 377 yards; thence  $126^{\circ}26'$ , 1,442 yards; thence  $216^{\circ}26'$ , 377 yards to the point of beginning.

(6) **Anchorage 5 southeast of Pea Patch Island.** On the northeast side of the channel along New Castle Range, bounded as follows: Beginning at latitude  $39^{\circ}34'28''$ , longitude  $75^{\circ}33'06''$ ; thence  $334^{\circ}$ , 2,343 yards; thence  $64^{\circ}$ , 512 yards; thence  $154^{\circ}$ , 2,343 yards; and thence  $244^{\circ}$ , 512 yards, to the point of beginning.

(7) **Anchorage 6 off Deepwater Point.** Southeast of the entrance to Christina River, on the east side of the channel along Cherry Island Range, bounded as follows: Beginning at latitude  $39^{\circ}41'31''$ , longitude  $75^{\circ}30'55''$ ; thence  $17^{\circ}$ , 2,747 yards; thence  $112^{\circ}$ , 847 yards; thence  $215^{\circ}$ , 1,340 yards; thence  $204^{\circ}$ , 893 yards; thence  $186^{\circ}30'$ , 500 yards; and thence  $286^{\circ}$ , 377 yards, to the point of beginning. Vessels must not cast anchor in the cable area at the lower end of this anchorage except in case of emergency.

(8) **Anchorage 7 off Marcus Hook.** On the southeast side of the channel along Marcus Hook Range, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude  $75^{\circ}25'50''$ ; thence northeasterly along the edge of the channel to longitude  $75^{\circ}23'30''$ ; thence  $207^{\circ}$ , 933 yards; thence  $237^{\circ}$ , 2,692 yards; thence  $287^{\circ}$ , 933 yards, to the point of beginning. A preferential area in this anchorage is designated for the use of vessels awaiting quarantine inspection, this area being 333 yards wide on the downstream side of a line projected from Blueball Road in Marcus Hook. Should the remainder of the anchorage be in use, the preferential area, when available, may be used by vessels not subject to quarantine inspection.

(9) **Anchorage 8 off Thompson Point.** On the south side of the channel along Tinicum Range, between Thompson Point and the east side of Crab Point, bounded as follows: Beginning at a point on the south edge of the channel along Tinicum Range at longitude  $75^{\circ}18'24''$ ; thence easterly along the edge of the channel to longitude  $75^{\circ}17'54''$ ; thence  $179^{\circ}$ , 267 yards; thence  $260^{\circ}30'$ , 793 yards; thence  $358^{\circ}$ , 425 yards, to the point of beginning.

(10) **Anchorage 9 near entrance to Mantua Creek.** On the southeast side of the channel along Mifflin Range, bounded as follows: Beginning at a point on the south-

east edge of the channel at longitude  $75^{\circ}14'26''$ ; thence northeasterly along the edge of the channel to longitude  $75^{\circ}12'01.5''$ ; thence  $203^{\circ}30'$ , 933 yards; thence  $233^{\circ}30'$ , 3,058 yards; and thence  $263^{\circ}30'$ , 933 yards, to the point of beginning. Vessels must not cast anchor in this anchorage in such manner as to interfere unreasonably with the passage of other vessels to and from Mantua Creek.

(11) **Anchorage 10 (naval) at Naval Base, Philadelphia.** On the north side of the channel along West Horseshoe Range, bounded as follows: Beginning at the southeasterly corner of Pier 7 (approximately latitude  $39^{\circ}53'11''$ , longitude  $75^{\circ}09'58.5''$ ); thence  $174^{\circ}$ , 525 yards, to the north edge of the channel along West Horseshoe Range; thence  $273^{\circ}30'$  along the edge of the channel, 880 yards; thence  $354^{\circ}$ , 433 yards, to the southeasterly corner of Pier 1; and thence  $88^{\circ}30'$ , 875 yards, to the point of beginning. This is a restricted naval anchorage.

(12) **Anchorage 11 at Gloucester.** On the east side of the channel south of the Walt Whitman Bridge at Gloucester, bounded as follows: Beginning at a point on the east edge of the channel at latitude  $39^{\circ}54'16''$ ; thence  $174^{\circ}30'$ , 500 yards, to latitude  $39^{\circ}54'02''$ , longitude  $75^{\circ}07'43''$ ; thence  $202^{\circ}$ , 1,133 yards; thence  $217^{\circ}30'$ , 1,142 yards, to the east edge of channel; thence northeasterly along the edge of the channel to the point of beginning.

(13) **Anchorage 12 between Gloucester and Camden.** On the east side of the channel adjoining and on the upstream side of Anchorage 11, from Gloucester to Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude  $39^{\circ}54'16''$ ; thence northerly along the edge of the channel to latitude  $39^{\circ}56'32.5''$ ; thence  $133^{\circ}$ , 283 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude  $39^{\circ}54'02''$ ; thence  $354^{\circ}36'$ , 500 yards to the point of beginning. The area between New York Shipbuilding Corporation Pier No. 2 and the MacAndrews and Forbes Company pier, Camden, shall be restricted to facilitate the movement of carfloats to and from Bulson Street, Camden. The area in front of the Public Service Electric and Gas Company pier shall be restricted to facilitate the movement of vessels to and from the pier. Should the anchorage become so congested that vessels are compelled to anchor in these restricted areas, they must move immediately when another berth is available.

(14) **Anchorage 13 at Camden.** On the east side of the channel adjoining and on the upstream side of Anchorage 12, to Cooper Point, Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude  $39^{\circ}56'32.5''$ ; thence northerly along the edge of the channel to latitude  $39^{\circ}57'39.7''$ ; thence  $139^{\circ}$ , 217 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude  $39^{\circ}56'26.5''$ ; thence  $313^{\circ}$ , 283 yards to the point of beginning.

(15) **Anchorage 14 opposite Port Richmond.** On the southeast side of the channel, north of Petty Island, bounded as follows: Beginning at a point on the southeast

edge of the channel at longitude 75°05'43''; thence 163°, 248 yards; thence 253°, 1,978 yards, to the southeast edge of the channel; and thence northeasterly along the edge of the channel to the point of beginning. Vessels having a draft of less than 20 feet must anchor southwest of Pier No. 11, Port Richmond. The area off the Cities Service Oil Company wharves, Petty Island, shall be restricted to facilitate the movement of vessels to and from the wharves.

(16) **Anchorage 15 off northeasterly end of Petty Island.** On the southeast side of the channel, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°05'34.7''; thence northeasterly along the southeast edge of the channel to longitude 75°05'09.5; thence 171°, 198 yards; thence 260°30', 667 yards; and thence 351°, 198 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the District Commander to shift position.

(17) **Anchorage 16 between Port Richmond and Five Mile Point.** On the northwest side of the channel, bounded as follows: Beginning at a point on the northwest edge of the channel at longitude 75°05'35''; thence northeasterly along the edge of the channel to longitude 75°04'20''; thence 328°, 125 yards; thence 243°, 450 yards; thence 251°, 475 yards; thence 257°, 1,042 yards; thence 174°30', 122 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the District Commander to shift position.

(b) **General regulations.** (1) Except in cases of great emergency, no vessel shall be anchored in Delaware Bay and River between Ship John Light and The Pennsylvania Railroad Company bridge at Delair, New Jersey, outside of the anchorage areas established in this section, or within a cable or pipe line area shown on a Government chart, or be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to obstruct or endanger the passage of any vessel. When an emergent condition exists due to congestion in the prescribed anchorage areas in the Delaware River, the District Commander may authorize the anchorage of vessels in locations other than the prescribed areas. Vessels so anchored must not be anchored within the channel limits. Any vessel anchored outside of the prescribed anchorage limits must move to a prescribed anchorage area when space becomes available.

(2) No vessel shall occupy any prescribed anchorage for a longer period than 48 hours without a permit from the District Commander. Vessels expecting to be at anchor for more than 48 hours shall obtain a permit from the District Commander for that purpose in either Anchorage 15 or Anchorage 16. No vessel in such condition that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and

then only for such period as may be permitted by the District Commander.

(3) Whenever, in the opinion of the District Commander such action may be necessary, he may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) Every vessel whose crew may be reduced to such number that it will not have sufficient men on board to weigh anchor at any time shall, before release or reduction of the crew, be anchored with two anchors with mooring swivel unless the District Commander shall waive the requirement of a mooring swivel.

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside of the anchorage area.

(6) Light-draft barges using the anchorages shall be anchored away from the deeper portions of the anchorages, so as not to interfere with the anchoring of deep-draft vessels. Any barges towed in tandem to an anchorage area shall be bunched together when anchoring.

(7) Upon approval of the District Engineer, Corps of Engineers, the District Commander may permit wrecking plant or other vessels legally engaged in recovering sunken property, or in laying or repairing pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engaged upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the District Commander in advance of all such proposed work.

(8) Whenever the maritime or commercial interests of the United States so require, the District Commander is hereby empowered to shift the position of any vessel anchored or moored within or outside an anchorage area, including any vessel which is so moored or anchored as to obstruct navigation or interfere with range lights.

(9) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(10) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws and regulations.

(c) **Regulations for explosives anchorage.** (1) All vessels carrying explosives and other dangerous cargo as defined in Title 46, Code of Federal Regulations, § 146.03-8, or on which explosives and other dangerous cargoes are to be loaded, shall be within Anchorage 2 when anchored, except as provided in subparagraph (7) of this paragraph. The maximum amount of explosives, or other dangerous cargo for which a permit is required in 46 CFR Parts 146-149, which may be carried or loaded at any time by a vessel anchored within Anchorage 2 shall not exceed 800 tons, except in cases of great emergency or by special permit from the District Commander.

(2) A written permit shall be obtained from the District Commander before vessels carrying explosives and other dangerous cargoes, or on which explosives and other dangerous cargoes are to be loaded within the weight limit specified in subparagraph (1) of this paragraph, may anchor in Anchorage 2, and no vessel shall anchor therein except by authority of such permit, which may be revoked at any time. This anchorage shall not be used by vessels which do not carry explosives and other dangerous cargoes, or on which explosives and other dangerous cargoes are not to be loaded, except in cases of great emergency or by special permit from the District Commander. All other vessels used in connection with loading or unloading explosives and other dangerous cargoes in this anchorage shall carry written permits from the District Commander and shall show such permits whenever required by him.

(3) Vessels shall be anchored in Anchorage 2 so as to be at least 2,200 feet apart, but the number of vessels which may anchor in the anchorage at any one time shall be at the discretion of the District Commander. This provision is not intended to prohibit barges or lighters from tying up alongside the vessels for the transfer of cargoes.

(4) Whenever any vessel or barge not mechanically self-propelled anchors in Anchorage 2 while carrying explosives and other dangerous cargoes, or on which explosives and other dangerous cargoes are to be loaded within the weight limit specified in subparagraph (1) of this paragraph, the District Commander may require the attendance of a tug upon such vessel or barge when in his judgment such action is necessary.

(5) Every vessel transporting, stowing, storing, or handling explosives and other dangerous articles as cargo, within the weight limit specified in subparagraph (1) of this paragraph, in the vicinity of Anchorage 2 shall display by day a red flag at least 16 square feet in area at its masthead, or at least 10 feet above the upper deck if the vessel has no mast, and shall display by night a red light in the same position specified for the flag.

(6) Fishing and navigation are prohibited within Anchorage 2 at all times when vessels which are moored in the area display a red flag by day or a red light by night.

(7) The District Engineer, U.S. Army Engineer District, Philadelphia, may authorize, in writing, a vessel carrying explosives for use on river and harbor works or on other work under Department of the Army permit, to anchor in or near the vicinity of such work. The District Commander will prescribe the quantity of explosives allowed and the conditions under which explosives shall be stored and handled in such cases.

(8) Vessels carrying explosives and other dangerous cargoes, or on which explosives and other dangerous cargoes are to be loaded, within the weight limit specified in subparagraph (1) of this paragraph, shall comply with the general regulations in paragraph (b) of this section when applicable.

(9) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any

vessel, and all others concerned, of the duties and responsibilities imposed upon them to comply with the regulations governing the handling, loading or discharging of explosives, and other dangerous articles, entitled "Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels."

**§ 202.159 Annapolis Harbor, Md.** (a) **The anchorage grounds—**(1) **Naval anchorage for deep draft vessels.** In Chesapeake Bay, bounded on the north by latitude 38°58'; on the east by a line bearing 203°05' from latitude 38°58', longitude 76°24'; on the south by latitude 38°56'30''; and on the west by a line bearing 139° from Greenbury Point Shoal Light. This anchorage is reserved for deep-draft naval vessels. Berths in the area will be assigned on application to the Commandant, Severn River Naval Command.

(2) **Middle Ground anchorage.** In Severn River, beginning at a point bearing 126°, 800 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; thence 79°20', 485 yards, to Annapolis Harbor Buoy 13; thence 144°, 220 yards; thence 153°10', 715 yards; thence 270°, 175 yards; and thence 313°30', 1,060 yards, to the point of beginning.

(3) **South anchorage.** In Severn River, beginning at a point on the shoreline of Horn Point, Eastport, bearing 270° from Annapolis Harbor Buoy 5; thence 90° to Annapolis Harbor Buoy 5; thence 313°30', 1,040 yards; thence 259°20', 710 yards, to a point bearing 189°30', 615 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; and thence 180° to the shoreline at Eastport. No vessels shall anchor within 100 feet of any wharf, marine railway, or other structure without permission of the owner thereof.

(4) **Naval anchorage for small craft.** In Severn River, beginning at a point on the prolongation of the line of the northeast seawall of the Naval Academy grounds, 80 feet from the face of the southeast seawall of the Naval Academy grounds; thence 81°, 470 yards to Annapolis Harbor Buoy 15; thence 125°45', 580 yards; thence 259°20', 1,035 yards; thence 310°, 230 yards; and thence 40°, parallel to the southeast seawall of the Naval Academy grounds, 400 yards, to the point of beginning. Except in case of emergency, no vessel shall be anchored in this area without permission of the Commandant, Severn River Naval Command. Anchorages will be assigned upon request to the station ship at the Naval Academy.

(5) **Anchorage A.** In Spa Creek, beginning at a point bearing 214°, 420 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; thence 130°, 200 yards; thence 246°20', 230 yards; thence 234°, 130 yards; thence 257°, 115 yards; thence 50°30', 100 yards; thence 42°30', 125 yards; and thence 34°, 200 yards, to the point of beginning.

(6) **Anchorage B.** In Spa Creek, beginning at a point bearing 204°, 660 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Acad-

emy grounds; thence 144°, 22 yards thence 204°45', 140 yards; thence 214°, 195 yards; thence 331°, 160 yards; and thence 54°, 285 yards, to the point of beginning.

(b) **The regulations.** (1) Except in case of emergency, no vessel shall be anchored in the area to the north and east of the Annapolis Channel bounded on the east by Greenbury Point; on the south by a line bearing 270° from the southern tip of Greenbury Point; on the west by the Annapolis channel; and on the north by the southern boundary of the cable area and the shoreline of the Government reservation and Carr Creek.

(2) Except in case of emergency, no vessel shall be anchored in Annapolis Harbor to the westward of the dredged channel and northward of Annapolis Harbor Buoy 5 (off Horn Point, Eastport) outside of the established anchorage areas, except in Spa Creek and the area to the southwestward of the Naval anchorage for small craft. No vessel shall be so anchored that any part of the vessel extends at any time within this area. Any vessel anchoring, under great emergency, within this area shall be placed as close to an anchorage area as practicable, and shall move away immediately after the emergency ceases.

(3) No vessel shall be anchored in the cable and pipeline area, lying between the Naval Academy and the Naval Engineering Experiment Station and having the following limits: Eastern limit, from mast at the landward end of Reina Mercedes Pier approximately 67° to white "Cable Crossing" sign at the Experiment Station; western limit, from "Cable Crossing" sign on the point at Fort Severn Beach 233° to American Dock, Naval Academy.

(4) Except in case of emergency, no vessel shall be anchored, without permission of the Commandant, Severn River Naval Command, in the Naval Academy Drill area described as follows: That portion of the Severn River lying to the northeastward of the Naval Academy, bounded on the north by the State Highway Bridge and on the south by the northern limit of the cable and pipeline area, excluding that area off the eastern shoreline inclosed by a line extending approximately 131° between the eastern abutment of the State Highway Bridge and the outboard end of the pier on Ferry Point. This drill area also includes the lower part of Dorseys Creek below the Naval Academy Drawbridge. Requests to anchor in this drill area shall be made to the station ship at the Naval Academy.

(5) The restrictions in this section do not apply to the anchoring or marking by buoys of apparatus used for the purpose of taking sea food, except within the cable and pipeline area described in subparagraph (3) of this paragraph.

(6) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, and the Superintendent, United States Naval Academy, and such agencies as they may designate.

§ 202.166 **York River, Va., naval anchorage.** (a) The anchorage grounds. Between Yorktown and the Naval Mine Depot, beginning at latitude 37°15'34'', longi-

tude 76°31'25''; thence to latitude 37°15'25'', longitude 76°31'39.5''; thence to latitude 37°16'21.5'', longitude 76°32'46''; thence to latitude 37°17'07.5'', longitude 76°34'17''; thence to latitude 37°17'55'', longitude 76°35'14.5''; thence to latitude 37°18'05'', longitude 76°35'01''; thence to latitude 37°17'20'', longitude 76°34'07''; thence to latitude 37°16'33.5'', longitude 76°32'34'', and thence to the point of beginning.

(b) **The regulations.** This anchorage is reserved for the exclusive use of naval vessels and except in cases of emergency, no other vessel shall anchor therein without permission from the local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

#### § 202.168 **Hampton Roads, Va., and adjacent waters.**

(a) **Hampton Roads—(1) Anchorage A, Hampton Bar.** South of a line running from latitude 37°00'45'', longitude 76°20'36'', across the mouth of Hampton Creek to latitude 37°00'47'', longitude 76°19'56''; thence along the shore to a point east of Mill Creek at latitude 37°00'44'', longitude 76°19'38''; thence to latitude 37°00'15'', longitude 76°19'29''; thence to latitude 36°59'33'', longitude 76°18'57''; thence to latitude 36°59'11'', longitude 76°19'00''; thence to latitude 36°59'09'', longitude 76°19'05''; thence to latitude 37°00'00'', longitude 76°22'08''; and thence northeast along the shoreline to the point of beginning.

(i) No vessel shall be anchored in such manner as to swing within 200 feet of the dredged channel leading to Hampton.

(ii) This anchorage is reserved for the use of vessels while undergoing examination by quarantine, customs, or immigration authorities. Upon completion of these examinations vessels shall move promptly to a regular anchorage.

(iii) The master of every mechanically propelled vessel using this anchorage shall keep the vessel in condition to move promptly under its own power upon notification by the Captain of the Port, and when any such vessel is in charge of a pilot the pilot shall remain on board until the vessel is safely anchored in a regular anchorage. No sailing vessel using this anchorage shall be left unattended by a tugboat while undergoing examination by quarantine, customs, or immigration authorities, except when its stay is likely to be of several hours' duration when it shall be anchored in the western part of the anchorage out of the way of other vessels before the tug and pilot leave.

(iv) No master of a vessel awaiting or undergoing quarantine inspection shall release any part of the crew until the vessel has been passed by the proper quarantine officials and safely anchored or moored in a regular anchorage.

(2) **Anchorage B, Hampton Flats (Naval).** Shoreward of a line described as follows: Beginning at latitude 37°00'00'', longitude 76°22'08''; thence to latitude 36°-

59°08.5'', longitude 76°19'04.5; thence to latitude 36°57'-57.5'', longitude 76°20'46.5''; and thence to latitude 36°58'56'', longitude 76°23'47'', including within the above-described limits an Explosives Handling Berth W covering a circular area of 1,200 yards diameter with its center at latitude 36°58'18'', longitude 76°20'51''.

(i) Vessels shall not be anchored within 425 yards of Anchorage F-1 when that anchorage is occupied by a vessel carrying explosives.

(ii) Vessels shall not be anchored within 300 yards of Explosives Handling Berth W when that berth is occupied by a vessel handling explosives.

(iii) Anchorage B, including Explosives Handling Berth W, is reserved for the use of Naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit the anchorage and berth to be used by merchant vessels. Upon notification that need for occupancy by Naval vessels is expected, the Captain of the Port may cause a sufficient area in the anchorage to be vacated to accommodate the number of Naval vessels scheduled to arrive.

(3) **Anchorage C, Newport News Bar.** Shoreward of a line described as follows: Beginning at latitude 36°58'56'', longitude 76°23'47''; thence to latitude 36°57'57.5'', longitude 76°20'46.5''; thence to latitude 36°57'44'', longitude 76°21'12.5''; thence to latitude 36°57'35.5'', longitude 76°21'29''; thence along the north side of Newport News Channel to latitude 36°57'20'', longitude 76°24'38''; and thence to the radio tower at approximately latitude 36°57'47.5'', longitude 76°24'40.5''.

(i) When Anchorage F-1, which lies within Anchorage C, is not occupied by vessels carrying explosives, it may be used as a general anchorage in the same manner as other portions of Anchorage C. It shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives, of a draft too great to permit it to use Anchorage F, desires to anchor therein. Vessels shall not be anchored within 425 yards of Anchorage F-1 when that anchorage is occupied by a vessel carrying explosives.

(ii) This anchorage is a general anchorage for all vessels, but when fleet operations are scheduled the Captain of the Port may, in his discretion, permit it to be used by naval vessels. Upon receiving word that any part of the fleet is expected, the Captain of the Port may cause a sufficient area in this anchorage to be vacated to accommodate the number of vessels scheduled to arrive.

(4) **Anchorage D.** Beginning at a point west of Norfolk Harbor Channel at latitude 36°57'33.5'', longitude 76°20'31.7''; thence south to latitude 36°57'26'', longitude 76°20'31.7''; thence to latitude 36°56'08'', longitude 76°22'23''; thence to latitude 36°56'00'', longitude 76°22'50''; thence to latitude 36°56'00'', longitude 76°23'34''; thence to latitude 36°56'09.5'', longitude 76°23'33.5''; thence to a point on the south side of Newport News Channel at latitude 36°57'27.5'', longitude 76°21'41''; and thence along the south side of Newport News Channel

and a line in prolongation thereof to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(ii) This anchorage shall be used by deep-draft vessels, wind-bound vessels from Lambert Point and Sewall Point, and vessels awaiting turn for docking. Other vessels may use this anchorage when permitted by the Captain of the Port.

(5) **Anchorage E, Newport News Middle Ground.** Beginning at a point on the south side of Newport News Channel at latitude 36°57'27.5'', longitude 76°21'41''; thence to latitude 36°56'09.5'', longitude 76°23'33.5''; thence to latitude 36°57'11'', longitude 76°25'02.5''; and thence to and along the south side of Newport News Channel to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(6) **Anchorage H.** Beginning at a point west of Norfolk Harbor Channel at latitude 36°57'26'', longitude 76°20'31.7''; thence southerly to latitude 36°57'07.7'', longitude 76°20'31.9''; thence southeasterly to a point on the west side of Norfolk Harbor Channel at latitude 36°57'01.5'', longitude 76°20'22.3''; thence along the west side of Norfolk Harbor Channel to latitude 36°56'00'', longitude 76°20'27''; thence to latitude 36°56'00'', longitude 76°22'50''; thence to latitude 36°56'08'', longitude 76°22'23''; thence to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(7) **Anchorage F for vessels carrying explosives—**(i) **Anchorage F (for shallow-draft vessels).** Beginning at latitude 36°56'03'', longitude 76°23'50''; thence to latitude 36°54'30'', longitude 76°23'55.5''; thence to latitude 36°54'30'', longitude 76°24'59''; thence to latitude 36°56'44'', longitude 76°24'50''; thence to the point of beginning.

(ii) **Anchorage F-1 (for deep-draft vessels).** Within Anchorage C and having a northeast boundary coincident with a portion of the northeast boundary of Anchorage C, beginning at latitude 36°58'06'', longitude 76°21'13''; thence to latitude 36°57'49.5'', longitude 76°21'36''; thence to latitude 36°57'47.5'', longitude 76°22'04''; thence to latitude 36°57'56'', longitude 76°22'30''; thence to latitude 36°58'19.5'', longitude 76°21'56''; thence to the point of beginning.

(iii) Vessels are forbidden to anchor within 425 yards of Anchorage F or between the northeast boundary of Anchorage F and the southwest boundary of Anchorage E.

(iv) When Anchorage F-1 is not occupied by vessels carrying explosives it may be used as a general anchorage in the same manner as other portions of Anchorage C, except that it shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives of a draft too great to permit it to use Anchorage F desires

to anchor. When Anchorage F-1 is occupied by a vessel carrying explosives, vessels shall not anchor in Anchorages B and C within 425 yards of Anchorage F-1. No vessel carrying explosives shall be anchored in Anchorage F-1 so as to swing within 500 yards of the Newport News Channel.

(v) Vessels carrying explosives or other dangerous cargo, including inflammable liquids, inflammable solids, oxidizing materials, corrosive liquids, compressed gases, and poisonous substances, shall be within Anchorage F or F-1 when anchored, except as provided in subdivision (x) of this subparagraph. Anchorage F is reserved for this special purpose and shall not be used by vessels carrying other classes of cargo except in cases of great emergency or by special permit from the Captain of the Port.

(vi) A written permit shall be obtained from the Captain of the Port before a vessel carrying explosives, or on which explosives are to be loaded, may proceed to an explosives anchorage; and no vessel shall occupy a berth in such an anchorage except by authority of such a permit which may be revoked at any time.

(vii) Vessels used in connection with loading or unloading explosives in anchorage areas, including tugs and stevedore boats, shall carry a written permit from the Captain of the Port. Such permits shall be shown whenever required by him or by his properly authorized agents.

(viii) Whenever any vessel not mechanically self-propelled anchors in an explosives anchorage while carrying explosives, the Captain of the Port may require the attendance of a tug upon such vessel when in his judgment such action is necessary.

(ix) Vessels carrying explosives shall comply with the general regulations in paragraph (h) of this section when applicable.

(x) The District Engineer, Corps of Engineers, may authorize a vessel carrying explosives for use on river and harbor works or on other work under permit issued by the District Engineer to anchor in or near the vicinity of such work without a permit from the Captain of the Port. The District Engineer will prescribe the quantities of such explosives allowed on such vessel and the conditions under which they are to be stored and handled, and will furnish the Captain of the Port with a copy of such instructions.

(b) **James River—(1) Anchorage G.** At the mouth of the river opposite Newport News; east of a line running from Barrel Point, latitude 36°54'53'', longitude 76°28'51'', across the mouth of Batten Bay to Candy Island, latitude 36°56'18'', longitude 76°29'05''; and shoreward of a line described as follows: Beginning at Fishing Point, latitude 36°57'50'', longitude 76°29'38''; thence to latitude 36°59'08'', longitude 76°27'56''; thence to latitude 36°58'37'', longitude 76°26'41''; thence to latitude 36°57'50'', longitude 76°26'04''; thence to latitude 36°57'08.5'', longitude 76°25'27''; thence to latitude 36°57'11'', longitude 76°25'04''; thence to latitude 36°55'52.5'', longitude 76°25'09.5''; and thence to latitude 36°54'00'', longitude 76°28'59''.

(2) **Anchorage G-1.** On the northeast side of the river downstream from the James River Bridge, and shoreward of a line described as follows: Beginning at latitude 36°59'41'', longitude 76°26'40''; thence to latitude 37°00'15'', longitude 76°27'52''; and thence to latitude 37°00'45'', longitude 76°27'17''.

(3) **Anchorage G-2.** On the northeast side of the river upstream from the James River Bridge, and shoreward of a line described as follows: Beginning at latitude 37°00'58'', longitude 76°27'23''; thence to latitude 37°00'24'', longitude 76°28'06''; thence to latitude 37°01'55'', longitude 76°31'19''; and thence to latitude 37°03'06'', longitude 76°30'29''.

(c) **East of Norfolk Harbor Channel—(1) Anchorage K-1.** Shoreward of a line described as follows: Beginning at the shoreward end of the jetty north of Army Base Pier No. 2, latitude 36°55'13'', longitude 76°19'42''; thence along the jetty to latitude 36°55'14'', longitude 76°19'46.5''; thence along the jetty to latitude 36°55'10'', longitude 76°19'49.5''; thence to a point on the east side of Norfolk Harbor Channel at latitude 36°55'06'', longitude 76°20'22''; thence northerly along the east side of Norfolk Harbor Channel to latitude 36°55'36.5'', longitude 76°20'20''; and thence to latitude 36°55'38'', longitude 76°19'47''.

(2) **Anchorage K-2.** South of a line running from Tanner Point latitude 36°54'13'', longitude 76°19'25'', across the mouth of Lafayette River to latitude 36°54'14'', longitude 76°18'43''; and shoreward of a line described as follows: Beginning at latitude 36°52'56'', longitude 76°19'08''; thence to a point on the east side of the dredged area alongside Norfolk Harbor Channel at latitude 36°53'04.5'', longitude 76°19'58.5'', thence northerly along the side of the dredged area to latitude 36°53'27'', longitude 76°20'02''; thence northwesterly along the side of the dredged area to latitude 36°53'31'', longitude 76°20'06''; thence northerly along the east side of Norfolk Harbor Channel to latitude 36°54'45.5'', longitude 76°20'19''; and thence to latitude 36°54'49'', longitude 76°19'40.5''.

(i) Anchorage is prohibited in the dredged channel to Lafayette River.

(3) **Anchorage K-3 (for yachts and pleasure craft).** That part of Lafayette River upstream from Anchorage K-2 and downstream from a line crossing the river below the Hampton Boulevard bridge from latitude 36°54'27.5'', longitude 76°18'22.5'', to latitude 36°54'11'', longitude 76°18'18''.

(i) Anchorage is prohibited in the dredged channel in Lafayette River.

(d) **Elizabeth River—(1) Anchorage H-1, West Norfolk.** An improved anchorage on the west side of Norfolk Harbor Channel, south of Craney Island, providing anchorage spaces 38 and 35 feet deep, each with a swing radius of 750 feet, and 3 anchorage spaces 20 feet deep, each with a swing radius of 500 feet, bounded as follows: Beginning at a point on the western boundary of Norfolk Harbor Channel at latitude 36°52'51.6'', longitude

76°20'08.8"; thence westerly to latitude 36°52'48.2", longitude 76°20'39.3"; thence southerly to latitude 36°52'18.8", longitude 76°20'34.3"; thence easterly to latitude 36°52'22.2", longitude 76°20'03.8"; and thence northerly along the western boundary of Norfolk Harbor Channel to the point of beginning.

(i) No vessel shall remain anchored in this anchorage awaiting loading for a period longer than 48 hours, except when non-availability of loading facilities, inclement weather, ice conditions, or other conditions reasonably require a longer period in awaiting turn for docking.

(ii) No vessel after receiving its load shall remain more than 12 daylight hours in this anchorage, i.e., vessels loaded during the afternoon or night shall clear the anchorage prior to the hour of darkness of the following day.

(2) **Anchorage L.** On the northeast side of Elizabeth River, south of Lambert Point, and shoreward of a line described as follows: Beginning at latitude 36°52'06.5", longitude 76°19'04.5"; thence to latitude 36°51'56.5", longitude 76°19'20"; thence to latitude 36°52'13", longitude 76°19'44.5"; and thence to latitude 36°52'21", longitude 76°19'34".

(3) **Anchorage M.** On the northeast side of Elizabeth River, opposite Pinner Point, and shoreward of a line described as follows: Beginning at latitude 36°51'29.5", longitude 76°18'37"; thence to latitude 36°51'32", longitude 76°18'45.5"; thence to latitude 36°51'42", longitude 76°19'00"; and thence to latitude 36°51'52" longitude 76°18'47.5".

(4) **Anchorage N-1, Smith Creek (for yachts and pleasure craft)**—(i) Mowbray Arch. Between Mowbray Arch and a line described as follows: Beginning at Ghent Bridge 150 feet from Mowbray Arch and continuing westerly the same distance therefrom to the intersection of the prolongation of the east side of Colonial Avenue; thence in a straight line to a point on the south side of Mill Street prolonged and 70 feet from Mowbray Arch; thence parallel to and 70 feet from Mowbray Arch to the south side of Pembroke Avenue prolonged; thence along the prolongation of the south side of Pembroke Avenue to a point 50 feet from Mowbray Arch; and thence in a straight line to a point on the south side of Fairfax Avenue prolonged and 40 feet from Mowbray Arch.

(ii) The Hague. Between the wall on the west side of the Hague and a straight line joining a point 40 feet easterly thereof in the south side of Fairfax Avenue prolonged with a point 70 feet easterly from the wall in a line perpendicular to the wall at the south end thereof.

(iii) No floats, rafts, lighters, houseboats, or other craft laid up for any reason shall be permitted within these anchorages, except by permission of the Captain of the Port.

(iv) No vessel shall anchor or moor alongside any wharf or pier in Smith Creek so as to extend more than 40 feet beyond the pierhead line except in the authorized anchorages.

(5) **Anchorage O, Hospital Point.** On the southwest side of Elizabeth River, adjacent to the Portsmouth Naval Hospital, and shoreward of a line described as follows: Beginning at latitude 36°50'57", longitude 76°18'43"; thence to a point on the southwest side of Norfolk Harbor Channel at latitude 36°51'05", longitude 76°18'23"; thence southeasterly along the side of the channel to latitude 36°50'49.5", longitude 76°18'00"; thence southeasterly along the side of the channel to latitude 36°50'33.5", longitude 76°17'50.5"; and thence to latitude 36°50'27", longitude 76°17'55".

(6) **Anchorage P, Port Norfolk.** On the southwest side of Elizabeth River, between Pinner Point and Western Branch Channel, and shoreward of a line described as follows: Beginning at latitude 36°51'25", longitude 76°19'59"; thence to latitude 36°51'44.5", longitude 76°19'47"; thence to a point on the southwest side of Norfolk Harbor Channel at latitude 36°52'01", longitude 76°19'42.5"; thence southeasterly along the side of the channel to latitude 36°51'32", longitude 76°19'01"; and thence to latitude 36°51'18", longitude 76°19'16".

(e) **Eastern Branch of Elizabeth River**—(1) **Anchorage Q, Berkley.** South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50'20", longitude 76°17'12.5"; thence to latitude 36°50'24", longitude 76°17'14.5"; thence to latitude 36°50'22.5", longitude 76°16'58.5"; and thence to latitude 36°50'13", longitude 76°16'59".

(2) **Anchorage R**—(i) Section 1. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50'11", longitude 76°16'17"; thence to latitude 36°50'18", longitude 76°16'19"; thence to latitude 36°50'20", longitude 76°16'05"; and thence to latitude 36°50'14.5", longitude 76°16'03".

(ii) Section 2. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50'15", longitude 76°15'48.5"; thence to latitude 36°50'21", longitude 76°15'50.5"; thence to latitude 36°50'17", longitude 76°15'18"; and thence to latitude 36°50'11", longitude 76°15'20".

(iii) Section 3. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50'10", longitude 76°15'15"; thence to latitude 36°50'15.5", longitude 76°15'12.5"; thence to latitude 36°50'10.5", longitude 76°14'50"; and thence to latitude 36°50'08", longitude 76°14'51".

(iv) No vessel shall anchor within 200 feet of permanent improvements.

(3) **Anchorage S**—(i) Section 1. On the north side of the river, upstream from the Virginian Railway bridge, and shoreward of a line described as follows: Beginning at latitude 36°50'23", longitude 76°14'18"; thence to latitude 36°50'18.5", longitude 76°14'18"; thence to latitude 36°50'14", longitude 76°14'35"; and thence to latitude 36°50'19.5", longitude 76°14'33".

(ii) Section 2. On the north side of the Eastern Branch, below the mouth of Broad Creek, and shoreward of a line described as follows: Beginning at latitude

36°50'22.5'', longitude 76°13'50''; thence to latitude 36°50'19.5'', longitude 76°14'12.5''; and thence to latitude 36°50'24'', longitude 76°14'13''.

(iii) Anchorage is prohibited within 200 feet of permanent improvements.

(f) **Willoughby Bay—(1) Anchorage J-1 (for yachts and pleasure craft).** East of the west end of Willoughby Spit, shoreward of a line running from latitude 36°57'54'', longitude 76°17'46'', to latitude 36°57'50.5'', longitude 76°17'49''.

(2) **Anchorage J-2 (for yachts and pleasure craft).** South of Willoughby Spit, shoreward of a line described as follows: Beginning at latitude 36°57'42'', longitude 76°16'21.5''; thence to latitude 36°57'44.5'', longitude 76°17'27''; thence to latitude 36°57'48'', longitude 76°17'43''; and thence to latitude 36°57'55.5'', longitude 76°17'44''.

(g) **Lower Chesapeake Bay south of Thimble Shoal Channel—(1) Anchorage L-A (naval).** Between Cape Henry and Little Creek, beginning at latitude 36°57'11.0'', longitude 76°03'03.0''; thence to latitude 36°55'41.0'', longitude 76°03'14.5''; thence to latitude 36°56'22.0'', longitude 76°05'53.5''; thence to latitude 36°57'01.5'', longitude 76°05'59.0''; thence to latitude 36°57'57.0'', longitude 76°09'35.0''; thence to latitude 36°58'47.0'', longitude 76°09'08.5''; thence to the point of beginning.

(i) This anchorage is reserved primarily for the use of naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit it to be used by merchant vessels. Movement of vessels through the area will not be restricted.

(2) **Anchorage L-C.** Northwest of Anchorage L-A, beginning at latitude 36°59'14'', longitude 76°10'56.5''; thence to latitude 36°58'18.3'', longitude 76°10'54''; thence to latitude 36°58'59'', longitude 76°13'32.5''; thence to latitude 36°59'56'', longitude 76°13'36.3''; thence to the point of beginning.

(i) This anchorage is primarily for the use of merchant vessels but the Captain of the Port may, in his discretion, permit it to be used by naval vessels, the commercial conditions at the time being given due consideration. No vessels shall occupy any berth in this anchorage without first obtaining permission from the Captain of the Port.

(3) **Anchorage L-E (for naval amphibious craft).** Southwest of Anchorage L-A, east of the Little Creek thorofare, and shoreward of a line described as follows: Beginning at Little Creek Harbor Jetty 1 light (approximately latitude 36°55'57.0'', longitude 76°10'36.0''); thence to latitude 36°58'04.0'', longitude 76°10'02.0''; thence to latitude 36°57'31.5'', longitude 76°07'55.0''; thence to latitude 36°55'25.0'', longitude 76°08'28.5''.

(i) This anchorage is reserved for the exclusive use of naval vessels and, except in case of emergency, no other vessel shall anchor therein without permission from local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

(h) **General regulations.** (1) Except in cases of great emergency, no vessel shall be anchored in Hampton Roads or adjacent waters outside of the anchorage areas established in this section or within a cable or pipe line area shown on a Government chart, nor be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to obstruct or endanger the passage of any vessel.

(2) No vessel shall occupy for a longer period than 30 days, unless a permit is obtained from the Captain of the Port for that purpose, any anchorage for which the time of occupancy is not otherwise prescribed in this section. No vessel in a condition such that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and then only for such period as may be permitted by the Captain of the Port.

(3) Whenever, in the opinion of the Captain of the Port, such action may be necessary, that officer may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) Every vessel whose crew may be reduced to such number that it will not have sufficient men on board to weigh anchor at any time shall, before release or reduction of the crew, be anchored with two anchors with mooring swivel unless the Captain of the Port shall waive the requirement of a mooring swivel.

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside the boundaries of the anchorage area.

(6) Any vessel anchoring under circumstances of great emergency outside an anchorage area shall be placed near the edge of the channel and in such position as not to interfere with the free navigation of the channel nor obstruct the approach to any pier nor impede the movement of any other vessel, and shall move away immediately after the emergency ceases, or upon notification by the Captain of the Port.

(7) Upon application, a berth in an anchorage, if available, will be assigned to any vessel by the Captain of the Port. He may grant revocable permits for the habitual use of the same berth, and no vessel shall occupy a berth habitually except under authority of such a permit.

(8) Upon approval of the District Engineer, Corps of Engineers, the Captain of the Port may permit wrecking plant or other vessels legally engaged in recovering sunken property or in laying or repairing legally established pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engaged upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the Captain of the Port in advance of all such proposed work.

(9) Whenever the maritime or commercial interests of the United States so require, the Captain of the Port is hereby empowered to shift the position of any vessel anchored or moored within or outside an anchorage area.

including any vessel which is so moored or anchored as to obstruct navigation or interfere with range lights.

(10) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(11) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws.

### PART 203—BRIDGE REGULATIONS:

§ 203.1 General. Drawbridges across navigable waters of the United States will not be opened to navigation for certain periods determined to be in the interest of public safety by the proper civil defense authorities during a major disaster or civil defense emergency indicated by a civil defense condition of "Air Raid Warning" (attack by enemy aircraft probable, imminent, or taking place) notwithstanding any general or special regulations heretofore or hereafter prescribed for the operation of any such drawbridge or drawbridges.

§ 203.215 Navigable streams flowing into Raritan Bay (except Raritan River and Arthur Kill), the Shrewsbury River and its tributaries, and all inlets on the Atlantic Ocean including their tributaries and canals between Sandy Hook and Bay Head, N.J.; bridges. (a) The owners of or agencies controlling drawbridges shall provide the appliances and the personnel necessary for the safe, prompt and efficient operation of the draws.

(b) Drawbridges shall be opened promptly for the passage of any vessel or other watercraft unable to pass under the closed spans, except as hereinafter provided.

(c) Signals—(1) Call signals for opening of draw.

(i) Sound signal. Three distinct blasts of a whistle, horn or megaphone, or three loud and distinct strokes of a bell, sounded within a reasonable hearing distance of the bridge.

(ii) Visual signal. To be used in conjunction with sound signals when conditions are such that sound signals cannot be heard. A white flag by day, a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

(2) Acknowledging signals by bridge operator—(i) Sound signals. Draw to be opened immediately: Same as call signal. Draw cannot be opened immediately, or, if open, must be closed immediately: Two long distinct blasts of a whistle, horn or megaphone, or two loud and distinct strokes of a bell, to be repeated at regular intervals until acknowledged by the vessel.

(ii) Visual signals. To be used in conjunction with sound signals when conditions are such that sound signals cannot be heard. Draw to be opened immediately: A white flag by day or a green light at night swung up

and down vertically a number of times in full sight of the vessel. Draw cannot be opened immediately, or, if open, must be closed immediately: A red flag by day, a red light by night, swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

(3) Acknowledging signals by the vessel. Vessels or other water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or if open must be closed immediately, shall acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day and a red light by night.

(d) Trains, automobiles, trucks, and other vehicles, vessels or other water craft shall not be stopped or manipulated in a manner hindering or delaying the operation of these draw bridges, but all passage over drawspans or through draw openings shall be so as to expedite both land and water traffic.

(e) The owners of or agencies controlling these bridges shall provide and keep in good legible condition two board gauges painted white, with black figures not less than 8 inches high, to indicate the headroom clearance under the closed drawspan at all stages of the tide. The gauges shall be so placed on the bridge that they will be plainly visible to the operator of the vessel approaching the bridge either up or downstream.

(f) These drawbridges shall not be required to open for craft carrying appurtenances unessential for navigation which extend above the normal superstructure. Military masts shall be considered as part of the normal superstructure. Upon request, the district engineer in charge of the locality will cause inspection to be made of the superstructure and appurtenances of any craft habitually frequenting those waterways, with a view to adjusting any differences of opinion in this matter between the vessel owner and the bridge owner.

(g) Copies of the regulations in this section shall be conspicuously posted on both the upstream and downstream sides of the bridges in such a manner that it can be easily read at any time.

(h) [Reserved]

(i) The regulations to govern the operation of the Ocean Avenue bridge across the mouth of the Shark River between Belmar and Avon-by-the-Sea, and to govern the operation of drawbridges across the Manasquan River, its navigable tributaries and the Bay Head-Manasquan Canal, New Jersey, prescribed under the dates of March 29, 1933, and January 18, 1937, respectively, are hereby revoked.

(j) The general regulations contained in paragraphs (a) to (g), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in this paragraph.

(1) Lemon Creek, N.Y.; the City of New York highway bridge at Bayview Avenue, Borough of Richmond, Staten Island, New York. The draw need not be opened for the passage of vessels between the hours of 4:00 p.m. and 8:00 a.m. from November 1, to March 31, inclusive,

and between the hours of 10:00 p.m. and 6:00 a.m. from April 1, to May 15, inclusive, and from October 16, to October 31, inclusive.

(2) **Shark River, N.J.** (i) For the purposes of the regulations in this paragraph, the Route 71, the New York and Long Branch Railroad Company and the Route 35 bridges, being less than 800 feet apart, shall be considered and operated as a unit. The owners thereof shall provide and install, for uninterrupted service, systems of electric signals on their respective bridges, so connected that the operator of any of the bridges may thereby simultaneously notify, by signal, the operators of all the other drawbridges of the desire of any vessel or other watercraft to pass through the draws. The operator of the first bridge to be passed by an approaching vessel or other watercraft shall be responsible for observing the approach of such vessel or other watercraft toward the bridge, for receiving and acknowledging the signal or notice for passing, and for communicating to the operators of the other bridges, the intention of such vessel or other watercraft to pass.

(ii) Except as otherwise provided in subdivisions (iii) and (iv) of this subparagraph from May 15, to September 30, inclusive, on Saturdays, Sundays, Memorial Day, Independence Day and Labor Day, between the hours of 9:00 a.m. and 9:00 p.m., and on weekdays, between the hours of 4:00 p.m. and 7:00 p.m., the lift span of the Route 71, the New York and Long Branch Railroad Company and the Route 35 bridges shall not be required to open except at half-hourly intervals on the hour and half-hour, for those vessels or other watercraft waiting to pass through the draws, provided that when once opened for the passage of any vessel or craft, the said bridge or bridges shall remain open sufficiently long to permit the passage of all vessels or craft which may be engaged in passing or which may be presenting themselves for passage.

(iii) The draws shall be opened promptly on signal for the passage of vessels in the event of emergencies.

(iv) The draws shall be opened promptly at any time for the passage of vessels owned, controlled or employed by the United States Government, the State government or municipal and local governments.

**§ 203.220 New Jersey Intracoastal Waterway and tributaries; bridges.** (a) The New Jersey Intracoastal Waterway referred to in this section is defined as that waterway extending through the bays and thoroughfares on the eastern coast of New Jersey from Manasquan Inlet on the north to Cape May on the south, including Cape May Canal to Delaware Bay.

(b) When drawbridges are less than 1,000 feet apart they shall, for the purposes of this section, be considered and operated as a unit. The owners thereof shall provide and install, for uninterrupted service, systems of electric signals on their respective bridges, so connected that the operator of any bridge of the group may thereby simultaneously notify, by signal, the operators of all

the other drawbridges of that group of the desire of the master of any vessel or other watercraft to pass through the draws. The operator of the bridge first in any group of bridges to be passed by an approaching vessel or other watercraft shall be responsible for observing the approach of such vessel or other watercraft toward that bridge, also for receiving the signal or notice for passing and for communicating, by means of the electric signals prescribed above, to the operators of the other bridges composing such group the purpose of such vessel or other watercraft to pass.

(c) Whenever any vessel or watercraft approaches a bridge affected by this section, and under which it cannot pass, the lawful signal of the desire of the master of the vessel or craft to pass through the draw opening shall be three blasts of a whistle or horn blown on the vessel or craft. These drawbridges shall not be required to open for craft carrying appurtenances unessential for navigation which extend above the normal superstructure. Upon request, the district engineer in charge of the locality will cause inspection to be made of the superstructure and appurtenances of any craft habitually frequenting those waterways, with a view to adjusting any differences of opinion in this matter between the vessel owner and the bridge owner. Appurtenances unessential for navigation shall include but not be limited to fishing, outrigger, radio or television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation will not include flying bridges, sailboat masts, pile driver leads, spud frames on hydraulic dredges, or other items of equipment clearly necessary to the intended use of the vessel.

(d) The draws in each and every bridge or group of bridges shall, upon the signal prescribed in paragraph (c) of this section, be promptly opened at any and all hours of the day or night, except as provided in paragraph (m) of this section for the passage of any vessel, vessels, or other watercraft unable to pass safely underneath the draw when closed. For bridges crossing the New Jersey Intracoastal Waterway, failure of the draws to be fully opened within 4 minutes from the signal to open shall be considered a violation of the requirement for prompt opening, except as provided in paragraph (m) of this section.

(e) If a car, train of cars, or other vehicle is, at the time of receiving the signal prescribed in paragraph (c) of this section, approaching any draw so closely that it cannot be safely stopped before reaching such draw, two blasts of a whistle or horn shall be blown on the bridge. As soon thereafter as such draw shall be cleared, such draw or all draws comprised in any group of bridges concerned shall be promptly opened, and three blasts of a whistle or horn blown on the bridge to indicate such clearance.

(f) After the draw or draws of any bridge or group of bridges shall have remained open for a period of 10 minutes or for such shorter period as may be necessary for the passage of vessels or other watercraft waiting to

pass, the draw or draws may be closed for the crossing of cars, trains, vehicles, or individuals, if any be waiting to cross. After being so closed for a period of 10 minutes or for such shorter times as may be necessary, the draw or draws shall be again promptly opened for the passage of vessels or other watercraft, if there be any desiring to pass.

(g) No vehicle, car, locomotive, or train shall be stopped on the drawspan of any bridge subject to this section; nor shall any such bridge carrying railway or tramway tracks be used for switching purposes, except those bridges for which special regulations are prescribed in paragraph (m) of this section; nor shall locomotives or trains be stopped in bridge blocks of railroad bridges in such manner as to hinder or delay the operation of any draw, except in cases of urgent necessity. Vessels shall not be so moored nor maneuvered as to delay or hinder unnecessarily closing the draw of any bridge. All passages of vessels and other watercraft through or under the drawbridges and all passage of cars, locomotives, trains, and other vehicles over drawbridges shall be prompt and as rapid as practicable in order to avoid unnecessary delay to either land or water traffic.

(h) The owner or owners of each and every draw-bridge covered by this section shall maintain in good and serviceable order the drawspan, together with the machinery and appliances required for operating the same, and the electric signal system prescribed in paragraph (b) of this section; shall provide such number of draw operators or tenders as may be found necessary to open and close the draws promptly; and shall also provide and maintain in good order on the bridge piers or fenders such fixtures as may be necessary for vessels to moor or make fast while waiting for the drawspan to be opened.

(i) The length of time that a draw has been opened shall be computed from the time that the drawspan begins to move in opening, and the length of time that a draw has been closed shall be computed from the time that the drawspan ceases to move in closing.

(j) At each opening of a draw full horizontal and vertical clearances shall be provided, regardless of the size or requirements of the passing vessel or other watercraft.

(k) The owner or owners of each and every bridge covered by this section shall provide and maintain in good legible condition two board gauges, with figures not less than 6 inches high, the figures painted black on a white background, or vice versa, to indicate the vertical clearance under the closed drawspan at all stages of the tide. The gauges shall be so placed on the ends of the drawspan fender that they shall be plainly visible to the master of a vessel or other watercraft approaching such bridge either up-stream or down-stream.

(l) The owner or owners of each and every bridge covered by this section shall cause to be kept a complete record of all openings of the draw and shall promptly report to the district engineer of the United States in charge of the river and harbor improvements in that

vicinity all cases in which the drawspan has been required to remain open for an unreasonable length of time or to remain closed for more than 10 minutes after the prescribed signal to open the draw has been given.

(m) The provisions of paragraph (d) of this section shall be applicable to the bridge of the Pennsylvania-Reading Seashore Lines, over Beach Thorofare at Atlantic City, N.J., only between the hours of 11:00 p.m. and 6:00 a.m. daily. Between the hours of 6:00 a.m. and 11:00 p.m. this bridge shall be opened upon signal from any vessel or craft desiring to pass at any time during the periods from 20 to 30 minutes past each hour, but may remain closed during such periods if no vessel or craft give such signal, provided that when once opened for the passage of any vessel or craft the said bridge shall remain open sufficiently long to permit the passage of all vessels or craft which may be engaged in passing or which may be presenting itself for passage. Between such hours (6:00 a.m. and 11:00 p.m.) this bridge shall not be opened except as provided for in this paragraph.

**§ 203.225 Navigable waters in the State of New Jersey; bridges where constant attendance of draw tenders is not required.** (a) The owners of or agencies controlling the bridges listed in paragraph (f) of this section will not be required to keep draw tenders in constant attendance.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

(f) The bridges to which this section applies, and the regulations applicable in each case, are as follows:

(1) **through (7)**; see U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

(8) **Beaver Dam Creek**; Ocean County highway bridge near Point Pleasant. At all times during January, February, March and December and between 4:00 p.m. and 8:00 a.m., during April, May, October and November, at least 24 hours' advance notice required. At all other

times the regulations in § 203.220 shall govern the operation of this bridge.

(8-a) **Bass River**; New Jersey State Highway Department bridge on U.S. Route 9 at New Gretna. At all times during January, February, and December, and between 11 p.m. and 7 a.m. from March 1 to November 30, inclusive, at least 6 hours' advance notice required.

(9) **Patcong Creek**; Atlantic County highway bridge 0.5 mile upstream from the mouth. At least 24 hours' advance notice required.

(10) **Tuckahoe River**; New Jersey State Highway Department bridge at Tuckahoe. At least 24 hours' advance notice required.

(11) **Great Channel**; Cape May County Bridge Commission bridge between Stone Harbor and Nummy Island. From November 1 to April 30, inclusive, at least 24 hours' advance notice required.

(11-a) **Schellenger Creek (Cape Island Creek)**; Cape May County highway bridge. The draw need not be opened for the passage of vessels, and the special regulations contained in paragraph (b) to (e), inclusive, of this section shall not apply to this bridge.

(12) **Maurice River**; New Jersey State Highway Department bridge at Main Street, Millville. At least 24 hours' advance notice required.

(13) **Manantico Creek**; New Jersey State Highway Department bridge near Millville. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(14) **Cohansey River**; New Jersey State Highway Department bridge at Broad Street, Bridgeton. The draw need not be opened for the passage of vessels and paragraphs (b) and (e), inclusive, of this section shall not apply to this bridge.

(15) **Alloway Creek**; Salem County highway bridges at Hancock Bridge and at Upper Hancock Bridge, and New Jersey State Highway Department bridge at Quinton. At least 24 hours' advance notice required.

(16) **Oldmans Creek**; New Jersey State Highway Department bridge near Nortonville, Pennsylvania-Reading Seashore Lines railroad bridge near Pedricktown, and Salem County highway bridge at Pedricktown. At least 24 hours' advance notice required.

(16-a) **Raccoon Creek**; Pennsylvania-Reading Seashore Lines railroad bridge at Bridgeport. At least four hours' advance notice required for opening this bridge during January, February and December between 10:00 p.m. and 6:00 a.m. on regular weekdays and at all times on Saturdays, Sundays and national holidays during these months.

(17) **Woodbury Creek**; Gloucester County highway bridge at National Park. At least 24 hours' advance notice required during December, January and February of each year.

(17-a) **Cooper River**; Pennsylvania Railroad Company bridge at North River Avenue, Camden County highway bridge at Federal Street and New Jersey State Highway

Department bridge at Admiral Wilson Boulevard, Camden. At least four hours' advance notice required.

(18) **Delaware River (back channel)**; The Pennsylvania Railroad Company bridge between Petty Island and Camden. At least 24 hours' advance notice required.

(19) **Rancocas River**; Burlington County highway bridge and Pennsylvania Railroad Company bridge between Riverside and Delanco, New Jersey State Highway Department bridge at Bridgeboro, and Burlington County highway bridge at Centerton. Between 11:00 p.m. and 7:00 a.m. each day of the year the draws of these bridges need not be opened for the passage of vessels. At least 24 hours' advance notice required for opening these bridges between 7:00 a.m. and 11:00 p.m. during January, February, March and December.

#### § 203.227 Delaware and Schuylkill Rivers, N.J. and Pa., in vicinity of Philadelphia and Bristol; bridges. (a)

Signals and lights—(1) Signals. When at any time during the day or night any vessel, tug, or other watercraft unable to pass under a closed drawbridge, approaches it with the intention of passing through the draw, the signal for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel or craft. If the drawspan is to be opened immediately when the signal is given on the vessel or craft, the bridgetender will reply with one blast of a whistle or horn indicating he is preparing to open the bridge. If at any time after signal from the vessel the drawbridge is not ready to be opened, the bridgetender will immediately sound four blasts of a whistle or horn. When the bridge is open and clear for vessel passage, the bridgetender will sound two blasts of a whistle or horn.

(2) Lights. The foregoing whistle or horn signals by the bridgetender will be supplemented by the following lights in the center of the drawspan, on both the upstream and downstream sides of the bridge:

(i) Supplementary bridge operating lights—(a) Fixed amber light. Bridge being prepared for opening. (b) Flashing red light. Bridge opening to be delayed.

(ii) Fixed navigation lights required by the Coast Guard—(a) Fixed red light. Bridge closed to navigation. Vessel unable to pass under closed drawspan must be kept under control so it can be stopped if necessary.

(b) Fixed green light. Bridge open to navigation. Vessel may proceed.

(iii) The fixed navigation lights referred to in subdivision (ii) of this subparagraph are those prescribed by the Coast Guard under Part 68 of this title. The supplementary bridge operating lights referred to in subdivision (i) of this subparagraph shall be of such visibility and placed at such locations as are satisfactory to the Coast Guard, so as not to conflict with the locations and intended purpose of the fixed lights. Supplementary bridge operating lights are not required for bridges across the Schuylkill River.

(b) Opening the draw. Upon hearing or perceiving the prescribed signal, the bridge tender shall immediately

clear the drawspan and open the draw to its full extent for the passage of the vessel or other craft: Provided, that the draw of a railroad bridge need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, nor within 5 minutes of the known time of passage of a scheduled passenger, mail, or express train; but in no event, except in case of breakdown of the operating machinery, shall the opening of the draw be delayed more than 5 minutes in the case of a highway bridge nor more than 10 minutes in the case of a railroad bridge: And provided further, that the draw need not be opened for the passage of a tug or other craft equipped with a movable stack or mast which can readily be lowered so as to permit its passage under the closed draw, unless such craft has in tow a vessel which is unable to pass under the closed draw or by reason of stress of weather it is unsafe to lower such stack or mast.

(c) Interference with operation. Vehicles, streetcars, locomotives, and trains shall not be stopped on the drawspans, nor shall locomotives or trains be stopped in the bridge blocks of railroad bridges in such manner as to delay the operation of the draw, except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passages over, through, or under the bridges shall be prompt, to avoid delay to either land or water traffic.

(d) Hinged stacks and masts. Each tug, towboat, barge, and other small craft regularly and habitually navigating the Schuylkill River shall be subject to inspection and measurement by the District Engineer, Corps of Engineers, to determine the exact height above the water surface of its pilot or deckhouses when such vessel is in its ordinary trim; and the District Engineer is hereby empowered to decide in each case whether or not the vessel shall be equipped with hinged or removable stacks, masts, and flagpoles which can be lowered to enable the vessel to pass under the closed draw of any or all of the bridges. If the District Engineer decides that such action should be taken, he shall notify the vessel owner and the bridge owner of his decision, specifying a reasonable time for making the alterations; and after the expiration of the time specified the draw need not be opened for the passage of such vessel unless it has in tow a vessel unable to pass under the closed draw or by reason of stress of weather it is unsafe to lower such stack or mast.

(e) Operating machinery. All drawbridges shall be equipped with adequate, quick-operating power machinery for opening and closing the draw, and this machinery shall at all times be kept in good and effective working condition and manned by competent operators.

(f) Clearance gages. The owners of each bridge shall provide and keep in good legible condition two board gages, painted white with black figures not less than six inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gages shall be so placed on the ends of the drawspan fenders that they

will be plainly visible to the navigator of a vessel approaching the bridge either upstream or downstream.

(g) The general regulations contained in paragraphs (a) to (f), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in paragraphs (h) and (i) of this section.

(h) Pennsylvania Railroad Company bridge across Schuylkill River near Christian Street. (1) The owner of or agency controlling this drawbridge will not be required to keep drawtenders in constant attendance. Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, at least 2 hours' advance notice of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(2) Upon receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on proper signal at the time specified in the notice for the passage of the vessel.

(3) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in subparagraph (1) of this paragraph may be reached by telephone or otherwise.

(i) City of Philadelphia bridge across Schuylkill River at South Street. (1) The draw need not be opened for the passage of vessels and paragraphs (a) to (e), inclusive, of this section shall not apply to the bridge.

(2) The owner of or agency controlling this bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations of this section.

#### **§ 203.228 Darby Creek, Pa., The Pennsylvania Railroad Company and Reading Company bridges near Es-**

**ington.** (a) The owners of or agencies controlling these bridges will not be required to keep draw tenders in constant attendance.

(b) Between 11:00 p.m. and 7:00 a.m. each day from May 15 to October 15, inclusive, the draws of these bridges need not be opened for the passage of vessels.

(c) Between 7:00 a.m. and 11:00 p.m. each day from May 15 to October 15, inclusive, the bridges will be opened upon signal from an approaching vessel or vessels at 7:15 a.m., 10:30 a.m., 1:00 p.m., 3:00 p.m., 7:30 p.m., and 10:30 p.m. and at other times on signal during these hours if such openings will not unduly delay railroad operations. Any vessel which may have passed through one of these bridges shall be passed through the draw of the other bridge without delay. When once opened for the passage of any vessel or craft the said bridges shall remain opened sufficiently long to permit the passage through both bridges of all vessels or craft which may be engaged in

passing and all accumulated vessels presenting themselves for passage.

(d) From October 16 to May 14, inclusive, whenever a vessel unable to pass under the closed bridges desires to pass through the draws, 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling each of the bridges to insure prompt opening thereof at the time required. On receipt of such advance notice the authorized representative, in compliance therein, shall arrange for the prompt opening of the draw on proper signal at approximately the time specified in the notice.

(e) In an emergency, the drawspans of these bridges will be opened as soon as possible after notification.

(f) The owners of or agencies controlling these bridges shall provide and keep in good legible condition two board gages of a type to be approved by the District Engineer to indicate the controlling minimum vertical clearance under both closed drawspans at all stages of the tide. These gages shall be so placed on the upstream and downstream ends of the right channel drawspan piers or fenders so that they will be plainly visible to the navigators approaching from either direction.

(g) The owner of or agency controlling each bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with information as to whom notice should be given, as specified in paragraphs (d) and (e) of this section, when it is desired that the bridge be opened and directions for communicating with such person by telephone or otherwise.

(h) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

**§ 203.229 Chester River, Pa.; the Reading Company bridge at Front Street, Chester, Pa.** (a) Between 6 a.m. and 10 p.m., the draw shall be opened promptly on signal for a vessel desiring to pass through the bridge. From 10 p.m. to 6 a.m., the draw will remain closed and the bridge unattended.

(b) The owner of or agency controlling this bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such manner that it can easily be read at any time, a copy of the regulations in this section.

**§ 203.230 Brandywine River, Del.; bridges. (a) Seventh Street bridge, Wilmington, Del.** (1) The owner of or agency controlling the bridge will not be required to keep a draw tender in constant attendance.

(2) The owner of or agency controlling the bridge shall provide the appliances and the personnel necessary for the safe, prompt and efficient opening of the draw at any time during the day or night, except as provided in sub-

paragraph (5) of this paragraph, for the passage of any vessel or other watercraft which cannot pass under the closed draw, when the following signal is received: Three blasts of a whistle or horn. When the draw of the bridge can be opened immediately, the draw tender shall reply by two blasts of a whistle or horn. When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the draw tender shall reply by one blast of a whistle or horn.

(3) Vehicles shall not be stopped on the drawspan, in such manner as to delay the operation of the draw except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passage over, through, or under the bridge shall be prompt to avoid delay to either land or water traffic.

(4) The owner of or agency controlling the bridge shall provide and keep in good legible condition two board gauges painted white with black figures not less than 6 inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gauges shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the navigators of a vessel approaching the bridge from either direction.

(5) At least 24 hours' advance notice will be required for opening this bridge at all times during January, February, March and December and between 8:00 p.m. and 6:00 a.m. from April to November, inclusive.

(i) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(ii) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(iii) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this paragraph together with a notice stating exactly how the representative specified in subdivision (i) of this subparagraph may be reached.

(iv) The operating machinery of the draw shall be maintained in a serviceable condition, and the draw shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

**(b) Pennsylvania Railroad bridge above Seventh Street and Highway bridges at Church Street and Sixteenth Street, Wilmington, Del.** (1) The draws of these bridges need not be opened for the passage of vessels.

(2) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides of the respective bridges, in such man-

ner that it can easily be read at any time, a copy of the regulations in this paragraph.

**§ 203.235 Christina River, Del.; bridges.** (a) The owners of or agencies controlling the bridges shall provide the appliances and the personnel necessary for the safe, prompt, and efficient opening of the draws at any time during the day or night for the passage of any vessel or other watercraft which cannot pass under the closed draws.

(b) Except as otherwise provided in paragraphs (g) and (h) of this section, the bridge tender upon hearing or perceiving the prescribed call signal shall immediately clear the drawspan and open the draw to its full extent for the passage of the vessel or other craft: Provided, that the draw of a railroad bridge need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, nor within 5 minutes of the known time of passage of a scheduled passenger, mail, or express train; but in no event, except in case of breakdown of the operating machinery, shall the opening of the draw be delayed more than 5 minutes in the case of a highway bridge, nor more than 10 minutes in the case of a railroad bridge.

(c) (1) Call signal for opening of draw. Three blasts of a whistle or horn.

(2) Acknowledging signal—(i) When the draw can be opened immediately. Two blasts of a whistle or horn.

(ii) When the draw cannot be opened immediately, or when it is open and is to be closed immediately. One blast of a whistle or horn.

(d) Vehicles, street cars, locomotives, and trains shall not be stopped on the drawspan, nor shall locomotives or trains be stopped in the bridge blocks of railroad bridges in such manner as to delay the operation of the draws, except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passage over, through, or under the bridges shall be prompt, to avoid delay to either land or water traffic.

(e) The owners of, or agencies controlling, the bridges shall provide and keep in good legible condition two board gages painted white with black figures not less than 6 inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gages shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the navigators approaching from either direction.

(f) The foregoing general regulations contained in paragraphs (a) to (e), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in paragraphs (g) and (h), of this section, prescribed to provide for closed or open periods when land or water traffic predominates and for the operation of a particular bridge on advance notice.

(g) (1) The owners of or agencies controlling the bridges listed in subparagraph (6) of this paragraph will not be required to keep draw tenders in constant attendance.

(2) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(3) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(4) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations together with a notice stating exactly how the representative specified in subparagraph (2) of this paragraph may be reached.

(5) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(6) The bridges to which the special regulations in this paragraph apply, the periods when draws need not be operated and advance notice required, are as follows:

(i) Pennsylvania Railroad Company bridge at Mile 4.12, Reading Company bridge at Mile 4.15 and Pennsylvania Railroad Company bridge at Mile 5.38. Between 8:00 p.m. and 6:00 a.m. the draws need not be opened for the passage of vessels. Between 6:00 a.m. and 8:00 p.m., at least 24 hours' advance notice required.

(ii) Delaware State Highway Department bridge at Newport. At least 24 hours' advance notice required.

(h) Closed periods. The Third Street, Walnut Street and Market Street bridges shall not be required to open for the passage of vessels between 7:00 a.m. and 8:00 a.m. and between 4:30 p.m. and 5:30 p.m., except on Sundays and legal holidays: Provided, That any vessel which has passed through one or more of these three bridges immediately prior to a closed period and will require passage through the other bridge or bridges in order to continue to its destination shall be passed through the draw or draws of such bridge or bridges without delay: Provided further, That in time of flood or other emergency the closed periods may be suspended or modified by the District Engineer, Corps of Engineers.

**§ 203.236 Appoquinimink River, Del.; Delaware State Highway Department bridge at Fennimore, Del.**

(a) The owner of this bridge will not be required to keep a draw tender in constant attendance.

(b) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, at least 24 hours' advance notice of the time the opening is required shall be given to the authorized representative of the owner of the bridge.

(c) Upon receipt of such advance notice, the authorized representative shall arrange for the prompt opening of

the draw at the time specified in the notice for the passage of the vessel.

(d) The owner of the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such manner that it can easily be read at any time, a copy of these regulations together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draw shall be maintained in a serviceable condition, and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

**§ 203.237 St. Jones River, Del.; Delaware State Highway Department bridges at Barkers Landing and at Lebanon.** (a) The owner of or agency controlling these bridges will not be required to keep draw tenders in constant attendance.

(b) Whenever a vessel unable to pass under the closed bridges desires to pass through the draws, at least 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling the bridges to insure prompt opening thereof as the time required.

(c) On receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on signal at approximately the time specified in the notice.

(d) The owner of or agency controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations of this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

**§ 203.237a Mispillion River, Delaware; Delaware State Highway Department bridge at Washington Street, Milford.** (a) The owner of or agency controlling this bridge will not be required to keep draw tenders in attendance from 8:00 p.m. to 8:00 a.m.

(b) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw from 8:00 p.m. to 8:00 a.m., at least 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling the bridge to insure prompt opening thereof at the time required.

(c) On receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on signal at approximately the time specified in the notice.

(d) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draw shall be maintained in a serviceable condition and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

**§ 203.237b Lewes and Rehoboth Canal, Delaware; Delaware State Highway Department bridges at Rehoboth.**

(a) The owner of or agency controlling these bridges will not be required to keep draw tenders in attendance from 5:00 p.m. to 7:00 a.m.

(b) Whenever a vessel unable to pass under the closed bridges desires to pass through the draws from 5:00 p.m. to 7:00 a.m., at least 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling the bridges to insure prompt opening thereof at the time required.

(c) On receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draws on signal at approximately the time specified in the notice.

(d) The owner of or agency controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representatives specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

**§ 203.239 Indian River Inlet, Del.; State Highway Department bridge.** (NOTE: Drawbridge replaced by fixed bridge; regulation no longer applicable.)

**§ 203.240 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay and into the Gulf of Mexico (including coastal waterways contiguous thereto and tributaries to such waterways and the Lower Atchafalaya River, La.), except the Mississippi River and its tributaries and outlets; bridges.** (a) Corporations or persons owning or controlling a drawbridge shall provide the same with the necessary tenders and the proper mechanical appliances for the safe, prompt, and efficient opening of the draw for the passage of vessels.

(b) If the weather conditions are good and sound signals can be heard when a vessel approaches a draw-

bridge and desires to pass through the draw, three distinct blasts of a whistle or horn shall be sounded or three calls through a megaphone shall be made from the vessel when within reasonable hearing distance of the bridge.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by three distinct blasts of a whistle or horn, by three calls through a megaphone, or by three loud and distinct strokes of a bell.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the drawtender shall reply by four or more short, distinct blasts of a whistle or horn, by four or more calls through a megaphone, or by four or more loud and distinct strokes of a bell (danger signal).

(c) When weather conditions prevent hearing the sound signals when a vessel approaches a drawbridge and desires to pass through the draw, signals shall be made from the vessel by swinging in circles at arm's length a lighted lantern at night and a flag by day.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by raising and lowering in vertical plane a number of times a lighted lantern at night and a flag by day.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the drawtender shall reply by swinging to and fro horizontally a number of times a lighted lantern at night and a flag by day.

(d) When a vessel wishes to pass two or more bridges close together or crossing a section of the waterway less than 500 feet in length, signals as prescribed above shall be given from the vessel for opening the first bridge, followed at an interval of about five seconds by the same signals for the second bridge, and so on, thus giving, at intervals of about five seconds, separate signals for each bridge the vessel desires to pass.

(e) When two or more vessels are approaching a bridge at nearly the same time from the same or opposite directions with the draw opened or closed, each of these vessels shall signal independently for the opening of the draw, and the drawtender shall reply as prescribed and in turn to the signal of each vessel.

(f) Where bridges are less than 500 feet apart, the signals to govern the movements of the approaching vessel shall be given from the bridge nearest the vessel. If the bridge can be opened immediately, the bridgetender shall await the reply signals from the other bridges and then give the signal circumstances require. If the nearest bridge cannot be opened immediately, the prescribed signal shall be given the approaching vessel at once to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) The draw shall be opened with the least possible delay upon receiving the prescribed signal: Provided, That the drawspan shall not be opened when a train is approaching so closely that it cannot safely be stopped before reaching the bridge, or when a passenger or mail train

is approaching within sight or hearing of the operator of the drawspan.

(h) When a bridgetender is about to close a draw, he shall sound four or more short, distinct blasts of a whistle or horn, four or more calls through a megaphone, or four or more loud and distinct strokes of a bell (danger signal).

(i) Trains, wagons, and other vehicles shall not be stopped on a drawbridge for the purpose of delaying its opening, nor shall watercraft be so manipulated as to hinder or delay the operation of a drawspan, but all passage over, through, or under a drawbridge shall be prompt, to prevent delay to either land or water traffic.

(j) The following provisions shall not relieve the owner of or agency controlling a drawbridge from opening the draw for the passage of vessels in accordance with paragraphs (a) through (i) of this section.

(1) A vessel shall not require the opening of the draw when such opening is needed only to provide additional clearance for appurtenances unessential to navigation of the vessel, or for appurtenances essential to navigation but which may be altered by hinging, telescoping, collapsing, or otherwise, so as to require no greater clearance than the highest fixed and essentially unalterable point of the vessel.

(2) Appurtenances unessential to navigation shall include but not be limited to fishing outriggers, radio antennae which are or can reasonably be made flexible or collapsible, television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation shall not include radar antennae, flying bridges, sailboat masts, piledriver leads, spud frames on hydraulic dredges, drilling derricks, derrick substructures and/or buildings, cranes on drilling or construction vessels, or other items of permanent and fixed equipment clearly necessary to the intended use of the vessel.

(3) Owners of or agencies controlling drawbridges shall report to the District Engineer in charge of the locality the names of any vessels causing bridge openings considered to be in violation of this paragraph. The District Engineer may at any time cause an inspection to be made of any craft so reported and is empowered to decide in each case whether or not the appurtenances are unessential to navigation. If the District Engineer decides a vessel has appurtenances unessential to navigation, he shall notify the vessel owner of his decision, specifying a reasonable time for making necessary alterations. If the vessel owner is aggrieved by the decision of the District Engineer, he may within 30 days after receipt of the request to perform necessary alterations appeal the decision to the District Engineer in writing. After receipt by the District Engineer, the appeal will be forwarded through channels to the Secretary of the Army. If the Secretary of the Army rules that an appurtenance is unessential to navigation, the District Engineer shall again specify to the vessel owner a reasonable time for making necessary alterations to the appurtenance, and after the expiration of the time specified, any operation of the

vessel in such a manner as to require drawbridge openings shall be deemed in violation of the regulations of this paragraph unless the necessary alterations shall have been made.

(4) The provisions of subparagraphs (1), (2) and (3) of this paragraph shall not be applicable to ocean or coastwise vessels engaged in foreign or domestic commerce.

(k) Clearance gages, of a type to be approved by the District Engineer, shall be installed on the upstream and downstream sides of each drawbridge by and at the expense of the owner of or agency controlling the bridge and such gages shall be kept in good repair and legible condition

NOTE: The special regulations contained in §§ 203.245 to 203.349, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.240.

**§ 203.245 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay and into the Gulf of Mexico, except the Mississippi River and its tributaries and outlets; bridges where constant attendance of draw tenders is not required.** (a) The owners of or agencies controlling certain bridges will not be required to keep draw tenders in constant attendance. The bridges to which this section applies are listed, and the special regulations applicable in each case are set forth, in paragraphs (f) to (j) inclusive, of this section. At all times not covered by the regulations in this section, and in all other respects, the regulations contained in § 203.240 shall govern the operation of these bridges.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(f) **Waterways discharging into Chesapeake Bay.**  
(1) **Susquehanna River, Md.;** The Pennsylvania Railroad Company bridge at Perryville. At least 24 hours' advance notice required.

(2) **Bohemia River, Md.;** Maryland State Roads Commission bridge at Cayots. From May 30 to September 30, inclusive, except on Saturdays, Sundays, State and Federal holidays, between sunrise and sunset, and from October 1 to May 29, inclusive, except between the hours of 7:00 p.m. on Fridays and 7:00 a.m. on Mondays, inclusive, the draw will not be required to be opened except upon 3 hours' advance notice. From October 1 to May 29, inclusive, between the hours of 7:00 p.m. on Fridays and 7:00 a.m. on Mondays, inclusive, the draw will not be required to be opened except upon advance notice given prior to 7:00 p.m. on Friday. From May 30 to September 30, inclusive, between sunrise and sunset on Saturdays, Sundays, State and Federal holidays, the regulations contained in § 203.240 shall govern operation of this bridge.

(3) **Bush River, Md.;** The Pennsylvania Railroad Company bridge at Bush River. From June 1 to September 30, inclusive, the draw will be required to be opened not more than two times each day on Saturdays and Sundays only between 10:00 a.m. and 5:00 p.m., on receipt of at least 24 hours' advance notice from the duly authorized representative of the Bush River Boat Club. At all other times the draw need not be opened for the passage of vessels. The notice posted in accordance with paragraph (d) of this section shall state exactly how the representative of the Bush River Boat Club may be reached.

(4) **Chester River, Md.;** Maryland State Roads Commission bridge at Chestertown. From October 1 to March 31, inclusive, and between 6 p.m. and 6 a.m. from April 1 to September 30, inclusive, at least six hours' advance notice required. Between 6 a.m. and 6 p.m. from April 1 to September 30, inclusive, the regulations contained in § 203.240 shall govern operation of this bridge.

(5) **Bear Creek, Md.;** The Baltimore County Revenue Authority highway toll bridges between Dundalk and Sparrows Point, Miles 1.3 and 1.8. Between the hours of 12 midnight and 8:00 a.m., inclusive (except Saturdays, Sundays, and the national and State legal holidays between April 16 and November 15 inclusive), at least one-half hour advance notice required.

(5-a) **Bear Creek, Md.;** the Baltimore County highway bridge at Wise Avenue. Between the hours of 6:00 p.m. and 8:00 a.m., inclusive, from May 1, to October 31, inclusive, and during all hours from November 1, to April 30, inclusive, at least 4 hours' advance notice required.

(6) **Colgate Creek, Md.;** City of Baltimore highway bridge at Baltimore. At least 5 hours' advance notice required.

(7) [Revoked]

(8) **Dorsey's Creek, Md.;** United States Naval Academy highway and railroad bridges; Maryland State Roads Commission bridge and Baltimore and Annapolis Railroad Company bridge at Annapolis. The draws need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(9) **Weems Creek, Md.;** Anne Arundel County highway bridge at West Annapolis. From October 1 to April 30, inclusive, and between sunset and sunrise from May 1 to September 30, inclusive, at least five hours' advance notice required.

(10) **South River, Md.;** Maryland State Roads Commission bridge at Edgewater. From December 1 to March 31, inclusive, the draw will not be required to be opened except upon at least 3 hours' advance notice for openings between 10:00 a.m. Monday and 7:30 p.m. Friday, inclusive, such notice to be given between 7:00 a.m. and 4:30 p.m. Monday through Friday; and the draw will not be required to be opened from 7:30 p.m. Friday until 10:00 a.m. Monday except upon advance notice given between 7:00 a.m. and 4:30 p.m. Monday through Friday. From April 1 to November 30, inclusive, the regulations contained in § 203.240 shall govern operation of this bridge.

(11) **South River, Md.;** Anne Arundel County highway bridge at Riva. (NOTE: The former drawbridge was replaced by a fixed bridge; regulation no longer applicable.)

(12) **Choptank River, Md.;** Baltimore and Eastern Railroad Company bridge at Denton. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(13) **Marshyhope Creek, Md.;** Maryland State Roads Commission bridge at Brookview. The draw need not be opened for the passage of vessels and paragraphs (b) to (d), inclusive, of this section shall not apply to this bridge. Paragraph (e) of this section shall apply to this bridge only to the extent that the operating machinery of the draw shall be maintained in a serviceable condition.

(13-a) **Nanticoke River, Del.;** Pennsylvania Railroad Company bridge at Seaford. From May 1, to September 30, inclusive, between the hours of 8:00 p.m. and 8:00 a.m., the draw will not be required to be opened. From October 1, to April 30, inclusive, the draw will not be required to be opened except on 4 hours' advance notice. From May 1, to September 30, inclusive, between the hours of 8:00 a.m. and 8:00 p.m., inclusive, the regulations contained in § 203.240 shall govern operation of this bridge.

(14) **Broad Creek River, Del.;** Delaware State Highway Department bridges at Bethel, and at Poplar Street and U.S. Route 13A, Laurel. Between the hours of 5:00 p.m. and 7:00 a.m., at least four hours' advance notice required. Pennsylvania Railroad Company bridge at Laurel. At least four hours' advance notice required. Delaware State Highway Department bridge at Delaware Avenue, Laurel. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(15) **Patuxent River, Md.;** Maryland State Roads Commission bridge at Benedict. Between 6:00 p.m. and 6:00 a.m. (local time), advance notice required, to be given verbally or by telephone to the Toll Captain at the Administration Building at the east end of the bridge before 6:00 p.m. The owner of or agency controlling the

bridge shall keep a complete record of all openings of the draw in such form as may be prescribed by the District Engineer, Corps of Engineers, and shall report to him all cases where the draw has been required to be kept open for an unreasonable length of time.

(16) **Neale Sound, Md.;** Maryland State Roads Commission bridge between Cobb Island and Cobb Neck. (NOTE: former drawbridge replaced by fixed bridge; regulation no longer applicable.)

(16-a) **Wicomico River (North Prong), Md.;** Maryland State Roads Commission bridges at Main Street and U.S. Route 50. The draws need not be opened for the passage of vessels between the hours of 8:00 a.m. and 9:00 a.m., 12 noon and 1:00 p.m., and 4:30 p.m. and 5:30 p.m.

(16-b) **Wicomico River (South Prong), Md.;** County Commissioners of Wicomico County bridge at Camden Street. The draw need not be opened for the passage of vessels between the hours of 8:00 a.m. and 9:00 a.m., 12 noon and 1:00 p.m., 4:30 p.m. and 5:30 p.m., and 9:30 p.m. and 6:00 a.m.

(16-c) **Wicomico River (South Prong), Md.;** County Commissioners of Wicomico County bridge at South Division Street. The draw need not be opened for the passage of vessels and paragraphs (b) to (e) inclusive, of this section shall not apply to this bridge.

(17) **Pocomoke River, Md.;** Maryland State Roads Commission bridge at Snow Hill. At least five hours' advance notice required.

(18) **Onancock River (Warrington Branch), Va.;** highway bridge at Onancock. At least three hours' advance notice required.

(19) **Kinsale Creek, Va.;** Virginia Department of Highways bridge at Kinsale. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(20) **Great Wicomico River, Va.;** Virginia Department of Highways bridge at Tipers Ferry. Between 6:00 p.m. and 6:00 a.m., advance notice required to be given to the draw tender on duty at the bridge before 6:00 p.m.

(21) **Urbanna Creek, Va.;** Middlesex County highway bridge at Urbanna. (NOTE: former drawbridge replaced by fixed bridge; regulation no longer applicable.)

(22) **Cat Point Creek, Va.;** Virginia Department of Highway bridge near Warsaw. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(22-a) **Mattaponi River, Va.;** Virginia Department of Highways bridge on Route 629 at Walkerton. At least 24 hours' advance notice required: Provided, That the draw tender service shall be increased on 30 days notice in writing from the District Engineer, Corps of Engineers; the degree of such service to be determined by the said District Engineer.

(23) **Chuckatuck Creek, Va.;** Virginia Department of Highways bridge on U.S. Route 17 at Eclipse. Between 7:00 a.m. and 3:00 p.m., daily, except Sundays, the regu-

lations contained in § 203.240 shall govern the operation of this bridge. At all other times, 4 hours' advance notice required, provided that if an emergency exists, the advance notice may be given without time limit.

(24) **Elizabeth River, Eastern Branch, Va.;** City of Norfolk highway bridge (Campostella Bridge) at Norfolk. Between 7:35 a.m. and 7:50 a.m., on week days only, the draw need not be opened except for the passage of tugs with tows.

(25) **Elizabeth River, Western Branch, Va.;** Atlantic Coast Line Railroad Company bridge at Bruce. Between 1:00 a.m. and 6:00 a.m., from April 1 to October 31, inclusive, at least 8 hours' advance notice required. Any vessel operator intending to make a return passage through the bridge during this period shall notify the bridge tender prior to 6:00 a.m. of the time he desires to make the return passage and the draw shall be opened at the specified time. From November 1 to March 31, inclusive, at least 4 hours' advance notice required.

(26) **Elizabeth River, Western Branch, Va.;** Virginia Department of Highways bridge at Hodges Ferry. At least eight hours' advance notice required.

(27) **Baines Creek, Va.;** Atlantic Coast Line Railroad Company bridge at Portsmouth. At least 24 hours' advance notice required.

(28) **Nansemond River, Western Branch, Va.;** Virginia Department of Highways bridge at Reid's Ferry. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(28-a) **Nansemond River, Va.;** Virginia Department of Highways bridge on U.S. Route 460 at Suffolk. At least 12 hours' advance notice required.

(29) **Appomattox River, Va.;** Seaboard Air Line Railroad Company bridge near Hopewell. At least 24 hours' advance notice required, such notice to be given to the Seaboard Air Line Railroad Agent at Hopewell, Virginia: provided, that a drawtender shall be placed in constant attendance, on 30 days' notice in writing from the District Engineer, Corps of Engineers.

§ 203.250 **Inlet from Little Annemessex River, Md.;** bridge (highway) at Crisfield, Md. (NOTE: drawbridge removed; regulation no longer applicable.)

§ 203.270 **Cambridge Harbor, Md.;** bridge. (a) The draw shall be promptly opened at any time for the passage of vessels unable to pass under the closed bridge, except during the following hours (eastern standard time) when it need not be opened: From 8 p.m. to 6 a.m.; from 12 noon to 12:10 p.m.; from 12:50 p.m. to 1 p.m.; and for 20 minutes before the scheduled time of departure from Cambridge of any regularly scheduled passenger train on the Pennsylvania Railroad.

(b) With the exceptions noted in paragraph (a) of this section, vessels have the right of way over vehicles or persons using the bridge.

(c) Whenever a vessel unable to pass under the closed bridge approaches it, the signal of a desire for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel. This signal shall be repeated at intervals until it is answered from the bridge. Upon receiving the signal from the vessel, the tender or operator of the bridge, in case the draw can be operated immediately, shall reply by three blasts of a whistle or horn. In case of accident to the machinery or other contingency necessitating delay in opening the draw, the signal from the vessel shall be answered by the tender or operator of the bridge by one blast of a whistle or horn.

(d) The owner of the bridge shall post and maintain a copy of the regulations in this section in a conspicuous place at each end of said bridge.

§ 203.280 **Miles River, Md.;** bridge (highway) at Easton, Md. (a) Between sunrise and sunset the draw of the above-mentioned bridge shall be promptly opened for the passage of any vessel unable to pass under the closed bridge.

(b) Whenever a vessel unable to pass under the closed bridge approaches it, the signal of a desire for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel. Upon receiving the signal from the vessel the tender or operator of the bridge, in case the bridge can be opened immediately, shall reply by three blasts of a whistle or horn. In case, however, of accident to the machinery or other contingency involving unavoidable delay in the opening of the draw, the signal shall be answered by one blast of a whistle or horn.

(c) A vessel wishing to pass the bridge between sunset and sunrise and unable to pass under the closed draw will request that the bridge be opened by notifying the draw tender of the time at which it is desired to pass and the draw of the bridge shall be opened as soon as practicable after the receipt of notice.

(d) A copy of the regulations in this section will be conspicuously posted on both the upstream and downstream sides of the bridge in such manner that it can be easily read at any time, together with a notice stating exactly how the draw tender, when not on duty at the bridge, may be reached.

(e) The operating machinery of the draw shall be kept in serviceable condition and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is kept in proper condition for satisfactory operation.

§ 203.285 **Oak Creek, tributary of Miles River, Md.;** bridge of the Baltimore, Chesapeake and Atlantic Railroad Company at Royal Oak, Md. (a) During the period from June 1 to September 30, inclusive, the draw shall be opened promptly at any time during the day or night for the passage of any vessel unable to pass under the closed bridge. During the period from October 1 to May 31, inclusive, the hours for opening the draw shall be from sunrise to sunset.

(b) Whenever a vessel unable to pass under the closed bridge approaches it, the signal of a desire for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel. This signal shall be repeated at intervals until it is answered from the bridge. Upon receiving the signal from the vessel the tender or operator of the bridge, in case the draw can be opened immediately, shall reply by three blasts of a whistle or horn. In case of accident to the machinery or other contingency necessitating delay in opening the draw, the signal from the vessel shall be answered by the tender or operator of the bridge by one long blast of a whistle or horn.

(c) A copy of the regulations in this section shall be posted in a conspicuous place on each side of the bridge.

**§ 203.290 Kent Island Narrows, Md.** (a) Bridge (highway) of Maryland State Roads Commission. (1) Between the hours of 1 hour before sunrise and 1 hour after sunset the draw shall be promptly opened for all vessels desiring to pass through it whose masts permanently remain standing or which have masts that may be unstepped but which are 20 feet or more in height and 5 inches or more in diameter at butt.

(2) Whenever a vessel of the kind described in subparagraph (1) of this paragraph shall approach the bridge and desire to pass through the draw, the signal therefor shall be three blasts of a whistle or horn blown on the craft, and when such signal is given the draw shall be opened forthwith if no person or vehicle is then in the way, and immediately upon the person or vehicle then on the bridge, if any, passing out of the way, and before any person or vehicle not then on the bridge shall be allowed to come upon it.

(3) If the draw is ready to be opened immediately when the signal is given on the craft, the signal shall be answered immediately by three blasts of a whistle or horn blown on the bridge, and if the draw is not ready to be opened immediately, by reason of persons or vehicles being on the bridge as aforesaid, or by reason of accident to the machinery or other contingency involving unavoidable delay in opening the draw, the signal for the craft shall be answered immediately by one blast of a whistle or horn blown on the bridge.

(b) Bridge of Baltimore and Eastern Railroad (Pennsylvania Railroad Co.). (NOTE: Bridge removed; regulation no longer applicable.)

**§ 203.305 Baltimore Harbor, Md.; bridge (highway) at Hanover Street across Middle Branch of Patapsco River.** (a) When, at any time between the hours of 5 a.m. and 6:30 a.m., 9:30 a.m. and 4 p.m., and 6 p.m. and 9 p.m., a vessel, tug, or any watercraft unable to pass under the bridge approaches it, the signal of intention to pass through the draw and for the draw to be opened shall be three blasts of a whistle or horn blown on the craft. When such signal is given, the bridge shall be immediately cleared, no vehicle or person not then on

the drawspan shall be allowed to come upon it, and the draw shall be opened forthwith.

If the draw is ready to be opened immediately, the draw operator shall answer immediately by three blasts of a whistle or horn blown on the bridge; and if the draw is not ready to be opened immediately, he shall answer by one short blast of a whistle or horn blown on the bridge.

(b) The draw shall not be required to open to vessels between 6:30 a.m. and 9:30 a.m. and between 4 p.m. and 6 p.m., except in cases involving the passage of fire boats, police boats, and craft similarly engaged in emergency operations. An attendant shall be kept on duty during these periods.

(c) When a vessel, tug, or any watercraft unable to pass under the bridge desires to pass through the draw at any time between the hours of 9 p.m. and 5 a.m., notice of such intention shall be given to the superintendent of the bridge by telephone or otherwise, either at the bridge before 9 p.m. or at his residence thereafter. If the notice is given between the hours of 5 a.m. and 9 p.m., or if at least one-half hour has elapsed since it was given, the draw shall be promptly opened at the time specified in the notice on signal given and answered as hereinbefore prescribed.

(d) The owner of the bridge shall keep conspicuously posted thereon, in such manner that it may be easily read at any time, a notice stating how the superintendent may be reached and shall arrange for ready telephonic communication with him at any time between 9 p.m. and 5 a.m., either from the bridge or from its immediate vicinity.

**§ 203.310 Severn River, Md.; bridge (highway) near Annapolis, Md.** (a) The leaves of the draw shall be promptly raised to their full height so as to provide full horizontal clearance through the bridge at any time during the day or night for all vessels desiring to pass through it whose masts are 15 feet or more in height or for any vessels whose hulls, deckhouses, or cargoes are of such height that they will not pass under the bridge when it is closed.

(b) Vessels have the right of way over vehicles or persons using the bridge.

(c) A vessel approaching the bridge and desiring to pass through the draw shall signal by three blasts of a whistle or horn. The signal shall be answered by three blasts of a whistle or horn that can be heard three-fourths of a mile from the bridge, and the draw shall be opened forthwith. In case, however, of accidents to the machinery or other contingency involving unavoidable delay in opening the draw, the signal shall be answered by one blast of a whistle or horn.

**§ 203.325 Potomac River at Washington, D.C.; draw-bridges.** The draws of the bridges need not be opened for the passage of vessels.

**§ 203.330 Anacostia River, Washington, D.C.; bridges.** (a) District of Columbia highway bridge at 11th Street SE. (NOTE: Being converted to fixed bridge.)

(b) Pennsylvania Railroad Company Freight Bridge No. 134.35. (1) During the period from April 1 to September 30, inclusive, on Saturdays, Sundays, and legal holidays, the lift span shall be opened on signal. During the same period, on weekdays between the hours of 10:00 a.m. and 8:00 p.m., the lift span shall be opened on signal on the hour for the passage of two or more vessels or other watercraft: provided, that in no case shall the delay to a single vessel be more than 30 minutes.

(2) During the period from April 1 to September 30, inclusive, on weekdays between the hours of 8:00 p.m. and 10:00 a.m., and from October 1 to March 31, inclusive, on Saturdays, Sundays, and legal holidays between the hours of 10:00 a.m. and 6:00 p.m., the lift span shall be opened on signal on the hour for the passage of any vessel or other watercraft: provided, that when once opened the bridge shall remain open sufficiently long to permit the passage of all vessels or other watercraft which may be in sight of the bridgetender and expected to desire a passage of the bridge. The time referred to shall be eastern standard or eastern daylight time, whichever is in effect locally.

(3) At all other times not covered, at least two hours' advance notice is required to be given to the designated representative of the owner of or agency controlling the bridge. The notice shall contain the name or number of the vessel and the expected time of its arrival at the bridge.

(4) Vessels employed or controlled by the United States Government, the District of Columbia and agencies of the State of Maryland shall be passed without delay through the draw of said bridge at any hour of the day or night upon giving the proper signal.

(5) Clearance gages, of a type approved by the District Engineer of the U.S. Army Engineer District in charge of the locality, shall be provided by the owners of the bridge. These gages shall be so set and maintained on the upstream and downstream fenders of the bridge as to show accurately and clearly the distance between the water surface and the lowest point of the closed lift span.

(6) The bridge shall not be required to be opened for the passage of vessels habitually using the waterway and carrying appurtenances such as radio antenna or flag staffs which as determined by the District Engineer of the U.S. Army Engineer District in charge of the locality, can readily be removed, lowered or hinged, and which are otherwise capable of clearing the bridge when closed. Habitual users are defined as any vessel passing the bridge as often as seven (7) times in a 30-day period.

(7) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such a manner that it can easily be read at all times, a copy of the regulations in this paragraph, together with a notice stating a local telephone

number where the representative specified in subparagraph (3) of this paragraph may be reached.

(c) District of Columbia highway bridge at South Capitol Street. (1) Between the hours of 6:00 a.m. and 9:00 a.m., and between the hours of 3:30 p.m. and 6:30 p.m., daily, the draw need not be opened for the passage of navigation, except that in the case of an emergency the draw will be opened for the passage of U.S. Government owned vessels, regardless of the hour.

(2) The draw will occasionally be closed to navigation, without advance notice, to permit uninterrupted transit of dignitaries across the bridge.

(3) At all times not covered by the regulations in this paragraph, and in all other respects, the regulations contained in § 203.240 shall govern the operation of this bridge.

(4) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations of this paragraph.

**§ 203.340 Rappahannock River, Va.; all bridges.**

(a) The corporations or persons owning or controlling a drawbridge shall provide the same with the necessary tenders and the proper mechanical appliances for the safe, prompt, and efficient opening of the draw and shall maintain the fender system in good condition for the passage of vessels.

(b) If the weather conditions are good and sound signals can be heard when a vessel approaches a drawbridge and desires to pass through the draw, three distinct blasts of a whistle, horn, or megaphone shall be sounded from the vessel when within reasonable hearing distance of the bridge.

(1) When the draw of the bridge can be open immediately, the draw tender shall reply by three distinct blasts of a whistle, horn, or megaphone or by three loud and distinct strokes of a bell.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the draw tender shall reply by two long distinct blasts of a whistle, horn, or megaphone or by two loud and distinct strokes of a bell.

(c) When weather conditions prevent hearing the sound signals when a vessel approaches a drawbridge and desires to pass through the draw, signals shall be made from the vessel by swinging in circles at arm's length a lighted lantern at night and a flag by day.

(1) When the draw of the bridge can be opened immediately, the draw tender shall reply by raising and lowering in vertical plane a number of times a lighted lantern at night and a flag by day.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the draw tender shall reply by swinging to and fro horizontally a number of times a lighted lantern at night and a flag by day.

(d) When a vessel wishes to pass two or more bridges close together signals as prescribed above shall be given from the vessel for opening the first bridge, followed at an interval of about 5 seconds by the same signals for the second bridge, and so on, thus giving at intervals of about 5 seconds, separate signals for each bridge the vessel desires to pass.

(e) When two or more vessels are approaching the bridge at nearly the same time from the same or opposite directions with the draw opened or closed, each of these vessels shall signal independently for the opening of the draw, and the draw tender shall reply as prescribed and in turn to the signal of each vessel.

(f) Where bridges are less than 500 feet apart, the signals to govern the movement of the approaching vessel shall be given from the bridge nearest the vessel. If that bridge can be opened immediately, the bridge tender shall await the reply signals from the other bridges and then give the signal circumstances require. If the nearest bridge cannot be opened immediately, the prescribed signal shall be given the approaching vessel at once, to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) The draw shall be opened with the least possible delay, upon receiving the prescribed signal: provided, that the drawspan shall not be opened when a train is approaching so closely that it cannot safely be stopped before reaching the bridge, or when a passenger or mail train is approaching within sight or hearing of the operator of the drawspan.

(h) When a bridge tender is about to close a draw, he shall sound two distinct blasts of a whistle, horn, or megaphone, or two loud and distinct strokes of a bell.

(i) Trains, vehicles, vessels or other watercraft shall not be stopped or manipulated in a manner hindering or delaying the operation of the draws, but all passage over the drawspans, or through the draw openings shall be in a manner to expedite both land and water traffic.

(j) Any vessel with or without tows requiring the opening of the draw of a bridge on which only one draw opening is protected by a fender system, shall pass through the opening so protected.

(k) A copy of the regulations in this section will be conspicuously posted on both upstream and downstream sides of the bridge in such manner that it can be easily read at any time.

**§ 203.343 Milford Haven, Va.; Virginia Department of Highways bridge between the mainland and Gwynns Island.** (a) The draw of the bridge shall not be required to be opened for the passage of vessels, habitually using the waterway and carrying appurtenances unessential for navigation (such as patent tong masts, flagstuffs, radio antennas, etc.), which are otherwise capable of clearing the bridge when closed: provided, that vessels engaged in commercial oystering or haul seine fishing shall be passed promptly at any time during the respective legal oystering or haul seine fishing seasons.

(b) Any vessel passing through the bridge as often as once a day for 5 consecutive days of any month will be regarded as a habitual user within the meaning of this section. Failure of any vessel to comply with the regulations after one warning by the person controlling the bridge shall be sufficient cause for refusal to open the draw for the future passage of the vessel.

**§ 203.349 Eastern Branch of Elizabeth River, Va.; Elizabeth River Tunnel Commission bridge between Norfolk and Berkeley.** (a) **Sound signals.** To be used if weather conditions are such that sound signals can be heard:

(1) **Call signal for opening of draw.** When a vessel approaches the bridge and desires to pass through the draw, three distinct blasts of a whistle, horn or megaphone or three loud and distinct strokes of a bell shall be sounded from the vessel when within reasonable hearing distance of the bridge.

(2) **Acknowledging signals—**(i) When the draw must be cleared of traffic and prepared for opening. The draw tender shall reply with two distinct blasts of a whistle, horn or megaphone or by two loud and distinct strokes of a bell. The vessel shall be checked and standby for either the signal in subdivision (ii) or subdivision (iii) of this subparagraph.

(ii) When the draw is clear of traffic and can be opened immediately. The draw tender shall reply with three distant blasts of a whistle, horn or megaphone or by three loud and distinct strokes of a bell.

(iii) When the draw cannot be opened for an indefinite period or when it is open and must be closed immediately. The draw tender shall reply with four or more distinct blasts of a whistle, horn or megaphone or four or more loud and distinct strokes of a bell, to be followed by the signal in subdivision (ii) of this subparagraph when the draw is to be opened.

(b) **Visual signals.** To be used if weather conditions are such that sound signals may not be heard.

(1) **Call signal for opening of draw.** When a vessel approaches the bridge and desires to pass through the draw signals shall be made from the approaching vessel by swinging in vertical circles at arm's length a lighted lantern at night and a flag by day.

(2) **Acknowledging signals—**(i) When the draw must be cleared of traffic and prepared for opening. The draw tender shall reply by swinging in vertical circles at arm's length a lighted lantern at night and a flag by day. The vessel shall be checked and standby for either the signal in subdivision (ii) or subdivision (iii) of this subparagraph.

(ii) When the draw is clear of traffic and can be opened immediately. The draw tender shall reply by raising and lowering in a vertical plane a number of times a lighted lantern at night and a flag by day.

(iii) When the draw cannot be opened for an indefinite period or when it is open and must be closed immediately. The draw tender shall reply by swinging to and fro

horizontally a number of times a lighted lantern at night and a flag by day, to be followed by the signal in subdivision (ii) of this subparagraph when the draw is to be opened.

(c) **Posting of regulations in this section.** The owner of or agency controlling the bridge shall keep a legible copy of the regulations in this section posted conspicuously on both the upstream and downstream sides of the bridge.

## PART 204—DANGER ZONE REGULATIONS:

§ 204.20 **Waters of Atlantic Ocean; Sea Girt Military Reservation, Sea Girt, N.J.** (a) **The danger zone.** (1) beginning at a point along the east shore of the Sea Girt Military Reservation at latitude 40°07'26''; thence northeasterly to latitude 40°07'34'', longitude 74°01'27''; thence easterly to latitude 40°07'15'', longitude 73°59'05''; thence southerly to latitude 40°06'27'', longitude 73°59'18''; thence westerly to latitude 40°06'48'', longitude 74°01'36''; thence northwesterly to a point on shore at latitude 40°07'00''.

(2) The area described in subparagraph (1) of this paragraph will be marked by spar buoys located at the offshore corners of the danger zone to be placed and maintained by the Superintendent, National Guard Training Center, Sea Girt, N.J.

(b) **Regulations.** (1) Range firing will normally take place between the hours of 8:00 a.m. and 6:00 p.m. on all Saturdays and Sundays during the period April to November, inclusive, and on certain designated weekdays during the period July to September, inclusive.

(2) No vessel shall enter or remain in the danger zone during the operation of the firing range excepting vessels of the United States.

(3) When firing is scheduled or is in progress a large red flag will be displayed from the flag staffs on the beach located at both the northern and southern boundaries of the reservation, so as to be clearly visible for a distance of at least 3 miles offshore.

(4) No permits to erect and maintain fish pounds within the zone will hereafter be issued.

(5) This section shall be enforced by the Adjutant General, State of New Jersey, and such agencies as he may designate.

§ 204.23 **Atlantic Ocean off Cape May, N.J.; Coast Guard Rifle Range.** (a) **The danger zone.** The waters of the Atlantic Ocean within an area described as follows: Beginning at Cape May West Jetty Light; thence 180° true, 800 yards; thence 250° true, 1,325 yards; and thence 335° true to the shore line.

(b) **The regulations.** (1) No vessel shall enter or remain in the danger area between sunrise and sunset daily, except as authorized by the enforcing agency.

(2) The regulations in this section shall be enforced

by the Commander, Third Coast Guard District, or his authorized representative.

§ 204.24 **Delaware Bay off Milford Neck; naval aircraft bombing target area.** (a) **The danger zone.** A circular area of one nautical mile radius having its center in Delaware Bay at latitude 38°58'12'', longitude 75°17'30''.

(b) **The regulations.** (1) Anchoring, trawling, crabbing, fishing and dragging in the danger zone are prohibited during daylight hours.

(2) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

§ 204.25 **Atlantic Ocean off Delaware Coast; anti-aircraft artillery firing area, Second Army.** (a) **The danger zone.** An area east of Bethany Beach described as follows: Beginning near Bethany Beach at latitude 38°31'15'', longitude 75°03'10''; thence to latitude 38°35'11'', longitude 74°57'30''; thence to latitude 38°30'15'', longitude 74°55'30''; thence to latitude 38°25'30'', longitude 74°57'15''; thence to a point on the shore at latitude 38°29'03''; and thence northerly along the shore to the point of beginning.

NOTE: The danger zone will be marked by buoys.

(b) **The Regulations.** (1) All firing during the months of October to May, inclusive, will be conducted between 8 a.m. and 4 p.m., e.s.t. Scheduled firing during the months June to September, inclusive, will be conducted between 12 noon and 6 p.m., e.s.t. Certain firing may be conducted, however, between 8 a.m. and 12 noon during this latter period and will be rounds fired at fixed points for settling weapons, testing and verification purposes only in accordance with established Department of the Army Safety Regulations, and will involve no restrictions on navigation. No firing will be conducted during hours of darkness.

(2) Firing will take place on certain days other than National holidays during October to May, inclusive, and on certain days other than Saturdays, Sundays, and National holidays during June to September, inclusive, as listed in public notice to be issued each year by the District Engineer, U.S. Army Engineer District, Philadelphia, Pennsylvania.

(3) When it is determined that no firing will take place on any of the days for which firing is scheduled, the public will be so advised by radio and other practicable means as far in advance as possible.

(4) Except as provided in subparagraph (6) of this paragraph, no vessel shall enter or remain in the danger zones during the time of firing unless specific permission is granted in each case by one of the representatives of the enforcing agency policing the area in patrol boats.

(5) Prior to the conducting of each firing practice, the danger zones will be adequately patrolled to insure that no watercraft are within the danger zones and to warn any watercraft in a danger zone that firing is to take place.

Any such watercraft shall, upon being so warned, immediately leave the area designated and shall remain outside the area until the conclusion of the firing practice.

(6) The regulations in this section shall not deny traverse of portions of the danger zones by regular cargo-carrying vessels, or commercial fishing vessels based at Lewes, Delaware. In case of the presence of any such vessel in a danger zone, the officer in charge of firing operations will cause the cessation or postponement of fire until the vessel has cleared the area. The vessel shall proceed on its normal course and shall not delay its progress.

(7) This section shall be enforced by the Commanding General, Second Army, Fort George G. Meade, Maryland, and such agencies as he may designate.

**§ 204.30 Chesapeake Bay; United States Army Proving Ground Reservation, Aberdeen, Md.** (a) **Restricted area defined.** The following indicates the limits of the waters of or adjacent to the Aberdeen Proving Ground, Maryland, and inside of which boundaries will lie the restricted area known as the Aberdeen Proving Ground, Maryland.

(1) Beginning at a point on the westerly side of Chesapeake Bay, at the south side of the mouth of Swan Creek, Harford County, Maryland, the most northerly point of the reservation known as Plum Point; thence southeasterly along the low-water mark on the shore of Chesapeake Bay to and across the north entrance of Spesutie Narrows to and thence along the low-water mark on the north shore of Spesutie Island to Locust Point; thence along straight line from Locust Point to Turkey Point for a distance of approximately 1,400 yards; thence following a line parallel with and 1,000 yards from the low-water mark on the easterly shore of Spesutie Island to a point 1,000 yards due southeast of Sandy Point; thence approximately southwest in a straight line to a point approximately 1,250 yards S. 10°30' W. from Bear Point; thence approximately 9,275 yards S. 51°04' W. to a point in Chesapeake Bay about 1,700 yards due east from Taylor Island Point; thence southwesterly in a straight course, except such variations as may be necessary to include all of Pooles Island to the southwesterly point of Pooles Island, thence in a northwesterly direction to the most southwesterly point of Spry Island, including all of Spry Island; thence northwesterly in a straight line to extreme southerly island off Lower Island Point; thence northwesterly in a straight line through Brier Point to a point in Seneca Creek where this line intersects a straight line which passes through monuments No. 124 and No. 125 on westerly part of Carroll Island; thence northeasterly in a straight line passing through Marshy Point, at the junction of Dundee Creek and Saltpeter Creek, to the intersection of the center line of Reardon Inlet with Gunpowder River, except such variations as may be necessary to exclude any and all parts of the point of land on the westerly side of Gunpowder River about one mile south of Oliver Point; thence northerly along the center line of Reardon Inlet to its

intersection with the southeasterly line of the right of way of the Pennsylvania Railroad; thence northeast along the Pennsylvania Railroad following the reservation boundary line to shore of Bush River, and along its western shore to Fairview Point; thence northeast in a straight line across Bush River to concrete monument No. 64, located on the eastern shore of Bush River, south of Chelsea; thence along the eastern shore of Bush River northerly to the mouth of Sod Run; thence by a broken line along the boundary of the reservation to Swan Creek; and thence in a straight line to Plum Point. (The above description may be traced on Coast and Geodetic Chart No. 1226).

(b) **Authority delegated Commanding Officer.** Under authority delegated by the Secretary of the Army to the Commanding Officer, Aberdeen Proving Ground, to designate from time to time, by suitably posted bulletins, the conditions under which the public, including food fishermen and crabbers may enter the waters of the Restricted Area, Aberdeen Proving Ground, the following regulations are published.

(c) **Penalty.** All persons who enter the restricted waters, except as authorized in this section, without the authority of the Commanding Officer, Aberdeen Proving Ground, Md., are under the terms of the information given above, guilty of a misdemeanor and upon conviction thereon are punishable by a fine not exceeding \$500.00 or by imprisonment not exceeding 6 months.

(d) **Entrance into restricted waters by the public over weekends and on National holidays.** Except as qualified in this paragraph, the waters included in Aberdeen Proving Ground Reservation are open throughout the year to the public for fishing, crabbing, and traffic but not for hunting from 5:00 p.m., Fridays to 7:30 a.m., Mondays and on National (not State) holidays from 5:00 p.m., on the day preceding the holiday to 7:30 a.m., on the day following the holiday.

(e) **Entrance at night into restricted waters by the public between the dates of February 1st and June 15th.** Between the dates of February 1st and June 15th, both dates inclusive, the waters included in Aberdeen Proving Ground Reservation are open to the public for fishing, crabbing, and other traffic but not hunting from 5:00 p.m. to 7:30 a.m., except on Tuesdays and Thursdays, which are reserved for night firing over water. If, however, there is to be night firing over water on Tuesdays or Thursdays, a siren located at Mulberry Point will be sounded at 4:35 p.m. During the hours of darkness, flashing red lights will be displayed at B-Tower, Mulberry Point; Meeks Point; Worton Point; Robbins Point; C-Tower (near Pond Point), and when Gunpowder River is endangered a flashing red light will be displayed at Maxwell Point. In addition, patrol boats will be stationed at various locations during the firing program. Local radio stations will also broadcast notification to fishermen, crabbers, and others that entrance to the restricted waters of Aberdeen Proving Ground on those evenings is prohibited.

(f) **Entrance at night into restricted waters by the public between dates of January 1st and January 31st**

and between dates of June 16th and December 31st provided night firing over water is not to be conducted. Between the dates of January 1st and January 31st, both dates inclusive, and between the dates of June 16th and December 31st, both dates inclusive, firing may be conducted on any night except Saturday. However, on dates in which night firing is not to be conducted, that portion of the waters of the Chesapeake Bay, Gunpowder River, and Bush River which are included in Aberdeen Proving Ground Reservation are open to the public for fishing, crabbing, and other traffic but not for hunting from 5:00 p.m., to 7:30 a.m. If firing is to be conducted on any night during these periods, a siren located at Mulberry Point will be sounded at 4:35 p.m., and during the hours of darkness, flashing red lights will be displayed at B-Tower, Mulberry Point; Meeks Point; Worton Point; Robbins Point; C-Tower (near Pond Point), and when Gunpowder River is endangered a flashing red light will be displayed at Maxwell Point. In addition, patrol boats will be stationed at various locations during the firing program. Local radio stations will also broadcast notification to fishermen, crabbers, and others that entrance to the restricted waters of Aberdeen Proving Ground on that date is prohibited.

NOTE: Daylight saving time, when observed in local communities, will also prevail at Aberdeen Proving Ground.

(g) No limitations on dates night firing may be conducted over land. The foregoing provisions and limitations on night firing over water in no way restrict night firing over land which may be conducted on any night of a working day throughout the year.

(h) Permits required from the Commanding Officer to set fixed nets in restricted waters. Fishermen and crabbers desiring to set fixed nets within the restricted waters of Aberdeen Proving Ground Reservation are required in every instance to have a written permit. A fixed net for the purpose of this paragraph is defined as a pound net, staked gill net, hedge fike net, hoop net, eel pot, crab pot, and all other types of nets fastened by means of poles, stakes, weights, or anchors. Permits to fish and crab within the restricted waters of Aberdeen Proving Ground may be obtained by written application to the Commanding Officer, Department of the Army, Aberdeen Proving Ground, Attention: Provost Marshal Division, Aberdeen Proving Ground, Md. Applicants for permits must state the location at which they desire to set fixed nets and state the period of time for which they desire the permit to cover. Nets placed in the restricted waters are subject to damage by gunfire and bombing, and the risk of such damage will be assumed by the holder of the permit.

Holders of permits for setting fixed nets must comply with the provisions of this part and also with § 206.50(d).

(i) Identification signs required at each location of fixed nets. Fishermen and crabbers who have been granted permits to fish or crab within the restricted waters of Aberdeen Proving Ground Reservation with fixed nets must at each location have a stake securely driven at the outer end of the line of nets on which is mounted a sign

board which contains their name and permit number. All stakes set within the restricted area established by this regulation will project at least three (3) feet above the surface of the water at all ordinary high stages of the tide. Nets and other fishing and crabbing structures erected will be marked by stakes set at intervals not greater than fifty (50) feet. Fishing and crabbing structures erected in Aberdeen Proving Ground waters will be plainly marked on both ends, and will be lighted with a white light between sunset and sunrise, by and at the expense of the owner.

(j) Removal of pound net poles and or stakes. At the end of the fishing and crabbing season, fishermen and crabbers must remove and haul away from the location all pound nets, pots, poles, or stakes used in their operation. Pound net poles or stakes must not be cast adrift after removal.

(k) Restrictions on fishermen and crabbers. It must be distinctly understood that holders of permits to fish or crab are not authorized to enter the restricted waters of Aberdeen Proving Ground Reservation outside the hours aforementioned. In addition, the privileges granted in this paragraph include no right to land nor to cut or procure pound net poles or stakes on the Aberdeen Proving Ground Reservation.

(l) Fishing and crabbing with any type of net prohibited in all creeks. Fishing and crabbing with any type of net is prohibited in all creeks of the Aberdeen Proving Ground Reservation.

(m) Compliance with Federal, State and county laws required. The taking of fish and crabs in the waters of Aberdeen Proving Ground Reservation and the setting of and location of nets, in a manner not in compliance with Federal, State and county laws is prohibited.

§ 204.32 Chesapeake Bay, in the vicinity of Chesapeake Beach, Md.; firing range, Naval Research Laboratory. (a) The danger zone—(1) Area A. A roughly rectangular area bounded on the north by latitude 38°39'55"; on the south by latitude 38°39'00"; on the east by longitude 76°31'03"; and on the west by the shore of Chesapeake Bay.

(2) Area B. The sector of a circle bounded by radii of 9,600 yards bearing 31° (to Bloody Bar Light) and 137°30' (to Buoy N "16 FF"), respectively, from the center at the southeast corner of building No. 3; excluding Area A.

(3) Area C. The segment of a circle inclosed by the arcs of two circles having radii of 9,600 yards and 13,200 yards, respectively, and bounded by the extended radii marking the north and south limits of Area B.

NOTE: All bearings referred to true meridian.

(4) Area D. A roughly rectangular area bounded on the north by an east-west line through Buoy C "1" at the entrance channel to Fishing Creek; on the south by an east-west line through Buoy C "23" northeast from Breezy Point; on the east by the established fishing structure limit line; and on the west by the shore of Chesapeake Bay.

(b) **The regulations.** (1) No vessel shall enter or remain in Area A at any time.

(2) No vessel shall enter or remain in Area B or Area C between the hours of 1:00 p. m. and 5:00 p. m. daily except Sundays, except that through navigation of commercial craft will be permitted in Area C at all times, but such vessels shall proceed on their normal course and shall not delay their progress.

(3) No fishing structures, other than those presently in established locations, which may be maintained, will be permitted to be established in Area D without specific permission from the Director, Naval Research Laboratory.

(4) The areas will be in use throughout the year, and no further notice is contemplated that firing is continuing.

(5) Prior to the conduct of each firing practice a patrol vessel will patrol the range to warn navigation. "Baker" will be flown from a conspicuous point on the patrol vessel and from a prominent position on shore.

(6) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

**§ 204.36 Chesapeake Bay, in vicinity of Bloodsworth Island, Md.; shore bombardment, air bombing, air strafing, and rocket firing area, U.S. Navy.** (a) **The danger zone.** All waters of Chesapeake Bay and Tangier Sound within an area bounded as follows: Beginning at latitude 38°08'15", longitude 76°10'00"; thence to latitude 38°12'00", longitude 76°10'00"; thence to latitude 38°12'00", longitude 76°07'00"; thence to latitude 38°13'00", longitude 76°06'00"; thence to latitude 38°13'00", longitude 76°04'00"; thence to latitude 38°12'00", longitude 76°02'00"; thence to latitude 38°12'00", longitude 76°00'00"; thence to latitude 38°08'15", longitude 76°00'00"; thence to the point of beginning.

(b) **The regulations.** (1) No vessel or other craft shall enter or remain in the restricted area when notified by an enforcing authority to keep clear or when firing is or will soon be in progress, except as provided in subparagraph (5) of this paragraph.

(2) Advance notice will be given of the dates and times of all firings and such notice will be published in the local "Notice to Mariners". The area will be in use intermittently throughout the year. On days when firing is conducted, firing will take place normally between sunrise and sunset, except that occasional night firing may be conducted between sunset and 12:00 midnight.

(3) Prior to the commencement of firing each day, surface or air search of the entire area will be made for the purpose of locating and warning all craft and persons not connected with the firing, and a patrol will be maintained throughout the duration of firing.

(4) Warning that ships are firing or soon will be firing will be indicated during daylight by a red flag prominently displayed from a tower off Okahanikan Point at latitude 38°11'45", longitude 76°05'35", and at night by a searchlight beam pointed into the sky. Warning that aircraft

are firing or soon will be firing will be indicated by the aircraft patrolling the area. All persons, vessels, and other craft shall clear the area when these signals are displayed or when warned by patrol vessels or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle.

(5) During hours when firing is in progress or is about to commence, no fishing or oystering vessels or other craft not directly connected with the firing shall navigate within the restricted area, except that deep-draft vessels proceeding in established navigation lanes and propelled by mechanical power at a speed greater than five knots normally will be permitted to traverse the area. When ships are firing or soon will be firing, permission for such deep-draft vessels to enter and traverse the area will be indicated during daylight by dipping the red warning flag to half-mast, and at night by flashing the warning searchlight. When aircraft are firing or soon will be firing in the danger zone, such deep-draft vessels may proceed unless warned to stay clear of the area by the method of warning known as "buzzing."

(6) When firing is not in progress or is not about to commence, oystering and fishing boats and other craft may operate within the restricted area.

(7) All projectiles, bombs, and rockets will be fired to land on Bloodsworth Island or Pone Island, but Naval authorities will not be responsible for damage by such projectiles, bombs, or rockets, or by Navy or Coast Guard vessels, to nets, traps, buoys, pots, fish pounds, stakes, or other equipment which may be located within the restricted area.

(8) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

**§ 204.40 Potomac River.** (a) **United States Naval Weapons Laboratory, Dahlgren, Va.—**(1) **The danger zones—**(i) **Lower zone.** The entire portion of the lower

Potomac River between a line from Point Lookout, Maryland, to Smith Point, Virginia, and a line from Blakiston Island Shoal Buoy 4A (off Blakiston Island) to Hollis Marsh. Long-range and aerial machinegun firing is normally conducted in this zone at infrequent intervals.

(ii) **Middle zone.** Beginning at the intersection of the Potomac River bridge with the Virginia shore; thence to lower Cedar Point Light; thence to latitude 38°19'06", longitude 76°57'07", which point is about 3,300 yards east-southeast of Lower Cedar Point Dredge Channel Range Front Light; thence to Line of Fire Buoy O, about 1,150 yards southwest by west of Swan Point; thence to Line of Fire Buoy M, about 1,700 yards south of Potomac View; thence to Line of Fire Buoy K, about 1,300 yards south by west of the lower end of Cobb Island; thence to Blakiston Island Shoal Buoy 4A, abreast of Blakiston Island abandoned lighthouse; thence southwesterly to a point on the northeast shore of Hollis at latitude 38°10' thence northwesterly to Line of Fire Buoy J, about 3,000

yards off Popes Creek, Virginia; thence to Line of Fire Buoy L, about 3,500 yards off Church Point; thence to Line of Fire Buoy N, about 800 yards off Colonial Beach; thence to Line of Fire Buoy P, about 1,000 yards off Bluff Point; thence to the Main Dock at the Naval Weapons Laboratory. Firing is normally conducted in this zone daily except Saturdays, Sundays, and national holidays.

(iii) Upper zone. Beginning at Mathias Point, Virginia; thence north to Mathias Point Shoal Light; thence north by east to Port Tobacco River Flats Light; thence east-southeast to Popes Creek Flats Lighted Buoy 26; thence east-southeast to Stone Pile Buoy 24 SP abreast of Popes Creek, Maryland; thence to the Maryland shore on an extension of the line connecting Buoys 26 and 24; thence southerly with the Maryland shore to a line passing through Persimmon Point Shoal Light to the Virginia shore, parallel to the Potomac River Bridge; thence northerly with the Virginia shore to the point of beginning. Aerial bombing and strafing is normally conducted in this zone at infrequent intervals.

(2) **The regulations.** (i) Firing normally takes place between the hours of 8:00 a.m. and 4:00 p.m. daily except Saturdays, Sundays, and national holidays, with infrequent night firing between 4:00 p.m. and 10:30 p.m. During a national emergency, firing will take place between the hours of 6:00 a.m. and 10:30 p.m. daily except Sundays.

(ii) When firing is in progress, no fishing or oystering vessels shall operate within the danger zone affected unless so authorized by the Naval Weapons Laboratory's patrol boats. Oystering and fishing boats or other craft may cross the river in the danger zone only after they have reported to the patrol boats and received instructions as to when and where to cross. Deep-draft vessels using dredged channels and propelled by mechanical power at a speed greater than five miles per hour, may proceed directly through the danger zones without restriction except when especially notified to the contrary. Small craft traversing the Middle Danger Zone up or down the river during normal firing hours shall proceed outside of the northeastern boundary thereof or as close thereto as safe navigation permits.

(iii) The regulations in this section shall be enforced by the Captain of the Port and the Commander of the United States Naval Weapons Laboratory and such agencies as they may designate. Patrol boats and planes will fly or expose a square red flag in clearing a danger zone.

(b) **Accotink Bay, Accotink Creek, and Pohick Bay; United States Military Reservation, Fort Belvoir, Va.—**  
(1) **The danger zone.** The waters of Accotink Bay, Accotink Creek, and Pohick Bay, Virginia, within and adjacent to the target ranges of the United States Military Reservation, Fort Belvoir, as follows: All of Accotink Bay; all of Accotink Creek below the bridge which crosses Accotink Creek approximately 400 yards south of U.S. Highway No. 1; and that portion of Pohick Bay bordering its north shore. The mouth of Accotink Bay and that por-

tion of Pohick Bay within the danger zone will be marked by the Post Commander with suitable warning buoys.

(2) **The regulations.** (i) When firing affecting the area is in progress, the Post Commander will post guards at such locations that the waters in the danger zone may be observed and arrange signals whereby these guards may stop the firing should any person be seen in the danger zone. When firing is in progress, the Post Commander will cause to be displayed both on the east shore of Accotink Bay at its mouth and near the danger zone boundary on Accotink Creek a red streamer which shall be visible to a person in a boat near those points.

(ii) Persons desiring to cross the waters in the danger zone shall first determine whether a red streamer is displayed on the east Shore of Accotink Bay at its mouth or near the danger zone boundary on Accotink Creek. If the red streamer is displayed, it will indicate that firing is in progress and that the waters in the danger zone are covered by rifle fire, and the area shall not be entered until the streamer is lowered.

(iii) The Post Commander is hereby authorized by using such agencies and equipment necessary to stop all boats at the boundary of the danger zone and prohibit their crossing the area until convenient to the firing schedule to do so.

#### § 204.41 Potomac River, Mattawoman Creek and Chicamuxen Creek; U.S. Naval Propellant Plant, Indian Head, Md.

(a) **The danger zone.** Beginning at a point on the easterly shore of the Potomac River at latitude 38°36'00'', longitude 77°11'00''; thence to latitude 38°34'30'', longitude 77°13'00''; thence to latitude 38°33'20'', longitude 77°14'20''; thence to latitude 38°32'20'', longitude 77°15'10''; thence to latitude 38°32'00'', longitude 77°15'00''; thence to latitude 38°32'00'', longitude 77°14'40''; thence to latitude 38°32'30'', longitude 77°14'00''; thence upstream along the easterly shoreline of Chicamuxen Creek to its head; thence downstream along the westerly shoreline of Chicamuxen Creek to the southernmost point of Stump Neck; thence northeasterly along the shoreline of Stump Neck to the mouth of Mattawoman Creek; thence along the southeasterly shore of Mattawoman Creek to the footbridge connecting the left bank of the creek to the Naval Propellant Plant; thence along the northwesterly shore of Mattawoman Creek from the footbridge to the mouth of the creek; thence in a northeasterly direction along the easterly shore of the Potomac River to the point of beginning.

(b) **The regulations.** (1) Firings consisting of controlled explosions within the danger zone, and controlled shore operations, or accidental explosions, hazardous to vessel traffic within the limits of the danger zone, may take place at any time of the day or night and on any day of the week.

(2) Flashing red lights, horns, and signs established at appropriate points will warn vessels of impending tests or operations considered to be hazardous to vessels within the danger zone.

(3) No vessel except vessels of the United States or vessels authorized by the enforcing agency shall enter or remain in the danger zone while lights are flashing, when warning horns are in operation, or when warned or directed by a patrol vessel.

(4) Nothing in this section shall prohibit the use of Mattawoman Creek or Chicamuxen Creek as a harbor or refuge because of stress of weather.

(5) Except as prescribed in subparagraph (3) of this paragraph, vessels may enter and proceed through the danger zone without restriction; however, accidental explosions may occur at any time and vessels entering the area do so at their own risks.

(6) Fishermen operating in the danger zone when warning signals are sounded shall evacuate the area immediately.

(7) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Propellant Plant, Indian Head, Maryland.

**§ 204.42 Chesapeake Bay, Point Lookout to Cedar Point; aerial gunnery range and target areas, U.S. Naval Air Station, Patuxent River, Md.**

(a) **Aerial gunnery range—**(1) **The danger zone.** The waters of Chesapeake Bay within an area described as follows: Beginning at the easternmost extremity of Cedar Point; thence easterly to the southern tip of Barren Island; thence southeasterly to latitude 38°01'15", longitude 76°05'33"; thence southwesterly to Kedges Strait Middle Ground Buoy 14 (approximately latitude 37°59'36", longitude 76°10'30"); thence northwesterly to Fish Net Buoy 20 W. (approximately latitude 38°02'20", longitude 76°17'26"); thence northerly to Point No Point Light; thence northwesterly to the shore at latitude 38°15'45"; thence northeasterly along the shore to the point of beginning. Aerial machinegun practice will be conducted in this area throughout the year.

(2) **The regulations.** (i) Through navigation of surface craft will be permitted at all times outside the target areas. Such vessels shall proceed on their normal course and shall not delay their progress.

(i) Advance notice will be given of the date on which firing practice is to begin, and such notice will be published in "Notice to Mariners". The range will be used throughout the year, and no further notice that firing is continuing will be given.

(iii) Prior to firing practice the gunnery range will be patrolled by surface craft or naval aircraft to warn any watercraft likely to be endangered by such firing by means of signals that firing is to take place. Surface craft so used will display a square flag. Naval aircraft will employ a method of warning consisting of repeated shallow dives to a low altitude in the area following each dive with a sharp pull-up.

(iv) Any watercraft under way or at anchor, upon being so warned, shall immediately vacate the area and shall remain outside the area until conclusion of firing practice.

(v) Military and naval vessels will conduct gunnery and training exercises in the aerial gunnery range. When there is apparent conflict between surface craft with attendant planes and planes operating under the control of the Naval Test Center, Patuxent River, Maryland, planes from the Naval Test Center are expected to keep clear.

(vi) Nothing in this section shall prevent oystering or the setting of fishing structures within the range outside the target areas in accordance with approved Federal and State regulations: Provided, that no permanent or semi-permanent fishing structures or oyster ground marker shall be placed on the western side of Chesapeake Bay between Point No Point and Cedar Point, without prior written approval of the Commanding Officer, U.S. Naval Air Station, Patuxent River, Maryland.

(vii) When operations are being conducted in the target areas, all projectiles, bombs, and other missiles will be released to fall within the areas, but naval authorities will not be responsible for damage by such missiles or by Naval or Coast Guard vessels to fishing structures or fishing equipment which may be located adjacent to the target areas.

(b) **Target areas—**(1) **Prohibited areas.** (i) A circular area with a radius of 400 yards having its center at latitude 38°16'54", longitude 76°22'00" (bearing approximately 176° true, 1,870 yards from Cedar Point Light).

(ii) A circular area with a radius of 600 yards having its center at latitude 38°13'00", longitude 76°19'00" (bearing approximately 153° true, 11,130 yards from Cedar Point Light).

(2) **Restricted area.** A circular area with a radius of 600 yards having its center at latitude 38°02'18", longitude 76°09'26" (bearing approximately 237°50' true, 7,000 yards from Holland Island Bar Light).

(3) **The regulations.** (i) Nonexplosive aerial projectiles will be dropped at infrequent intervals in the areas described in subparagraph (1) (i) and (ii) of this paragraph. The areas shall be closed to navigation at all times except for vessels engaged in operational and maintenance operations as directed by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Maryland. The areas will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the areas. Vessels which have inadvertently entered the danger zones upon being so warned shall leave the areas immediately.

(ii) Nonexplosive aerial projectiles will be dropped and aerial machine gun firing will be conducted in the area described in subparagraph (2) of this paragraph. Operations will be conducted throughout the year from sunrise to sunset daily and no vessel or other craft shall enter or remain in the area during daylight hours, except on prior written approval of the Commanding Officer, U.S. Naval Station, Patuxent River, Maryland. The area will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the area. Vessels which

have inadvertently entered the danger zone upon being so warned shall leave the area immediately.

(c) The regulations in this section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

**§ 204.44 Chesapeake Bay, in vicinity of Tangier Island; Naval guided missiles test operations area.** (a) **The danger zone—(1) Prohibited area.** A circle 1,000 yards in radius with its center at latitude 37°47'54'', longitude 76°03'48''.

(2) **Restricted area.** A circle three nautical miles in radius with its center at latitude 37°47'54'', longitude 76°03'48'', excluding the prohibited area.

(b) **The regulations.** (1) Vessels or other craft shall not enter or remain in the prohibited area at any time unless authorized to do so by the enforcing agency.

(2) Except as otherwise provided in subparagraph (6) of this paragraph, vessels or other craft shall not enter or remain in the restricted area when firing is or will soon be in progress unless authorized to do so by the enforcing agency.

(3) Advance notice will be given of the date on which the first firing is to be conducted and such notice will be published in "Notice to Mariners." Thereafter, the danger zone will be in use intermittently throughout the year and no further notice is contemplated that firing is continuing.

(4) Warning that firing is or will soon be in progress will be indicated by a red flag displayed from one of six dolphin platforms on the perimeter of the prohibited area, and by patrol vessels within the danger zone or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle. Surface or air search of the entire area will be made prior to the commencement of firing on each scheduled day. During periods of firing a patrol vessel will remain in the approaches to the restricted area and maintain continuous contact with the firing planes to warn when the area is not clear.

(5) Upon observing the warning flag or upon receiving a warning by any of the patrol vessels or aircraft, vessels or other craft shall immediately vacate the restricted area and remain outside the area until the conclusion of firing for the day.

(6) This section shall not deny traverse of portions of the restricted area by commercial craft proceeding in established steamer lanes, but when firing is or will soon be in progress all such craft shall proceed on their normal course through the area with all practicable speed.

(7) All projectiles, bombs and rockets will be fired to land within the prohibited area, and on or in the immediate vicinity of a target in the restricted area located adjacent to the west side of Tangier Island. The Department of the Navy will not be responsible for damages by such projectiles, bombs, or rockets to nets, traps, buoys,

pots, fishpounds, stakes, or other equipment which may be located within the restricted area.

(8) The regulations of this section shall be enforced by the Commander, Naval Air Bases, Fifth Naval District, Norfolk, Virginia, and such agencies as he may designate.

**§ 204.46 Chesapeake Bay, South of Tangier Island, Virginia; naval firing range.** (a) **The danger zone.** Beginning at latitude 37°46'39'', longitude 75°57'43'', thence to latitude 37°43'42'', longitude 75°55'30''; thence to latitude 37°27'00'', longitude 76°02'48''; thence to latitude 37°27'00'', longitude 76°08'00''; thence to latitude 37°45'00'', longitude 76°09'48''; thence to latitude 37°45'00'', longitude 76°08'51''; and thence along the circumference of a circle of five nautical miles radius whose center is at latitude 37°47'54'', longitude 76°03'48'', to the point of beginning.

(b) **The regulations.** (1) Any vessel propelled by mechanical means or by sail at a speed greater than five knots may proceed through the danger zone to and from points without, but not from one point to another point within, the area, except when especially notified to the contrary.

(2) All vessels, other than naval craft, are forbidden to anchor within the danger zone except in cases of great emergency. All vessels anchoring under circumstances of great emergency within the area shall leave the area immediately after the emergency ceases or upon notification by the enforcing agency.

(3) Fishing, oystering, clamming, crabbing, and other aquatic activities are forbidden within the limits of the danger zone, except that existing fishing structures licensed by the State of Virginia may be maintained and operated; Provided, the owners thereof obtain written permits from the enforcing agency designated in subparagraph (5) of this paragraph.

(4) Day and night firing over the range will be conducted intermittently by one or more vessels, depending on weather and operating schedules. When firing is in progress, adequate patrol by naval craft will be conducted to prevent vessels from entering or remaining within the danger zone.

(5) This section shall be enforced by the Commandant, Fifth Naval District, U.S. Naval Base, Norfolk, Virginia, and such agencies as he may designate.

**§ 204.48 Atlantic Ocean and connecting waters in vicinity of Myrtle Island, Va.; Air Force practice bombing, rocket firing, and gunnery range.** (a) **The danger zone.** The waters of the Atlantic Ocean and connecting waters within an area described as follows: Beginning at latitude 37°12'18'', longitude 75°46'00''; thence southwesterly to latitude 37°08'21'', longitude 75°50'00''; thence northwesterly along the arc of a circle having a radius of three nautical miles and centered at latitude 37°11'16'', longitude 75°49'29'', to latitude 37°10'14'', longitude 75°52'57''; thence northeasterly to latitude 37°14'30'', longitude 75°48'32''; thence southeasterly to

37°13'38", longitude 75°46'18"; and thence southeasterly to the point of beginning.

(b) **The regulations.** (1) No vessel shall enter or remain in the danger zone except during intervals specified and publicized from time to time in local newspapers or by radio announcement.

(2) This section shall be enforced by the Commanding General, Tactical Air Command, Langley Air Force Base, Va., and such agencies as he may designate.

**§ 204.49 Chesapeake Bay off Plumtree Island, Hampton, Va.; Air Force precision test area.** (a) **The danger zone.** The waters of Chesapeake Bay and connecting waters within an area bounded as follows: Beginning at latitude 37°08'12", longitude 76°19'30", which is a point on the circumference of a circle of 10,000-foot radius with its center on Plumtree Point at latitude 31°07'30", longitude 76°17'36"; thence clockwise along the circumference of the circle to latitude 37°09'06", longitude 76°18'00"; thence southeasterly to latitude 37°08'12", longitude 76°17'48"; thence clockwise along the circumference of a circle of 4,000-foot radius (with its center at latitude 37°07'30", longitude 76°17'36") to latitude 37°07'48", longitude 76°18'24"; thence northwesterly to the point of beginning.

(b) **The regulations.** (1) The danger zone will be in use not more than a total of 4 hours per month, which hours shall be during not more than any 2 days per month.

(2) No vessel shall enter or remain in the danger zone during periods of firing or bombing or when the zone is otherwise in use.

(3) The Commander, Tactical Air Command, Langley Air Force Base, Va., shall be responsible for publicizing in advance through the Coast Guard's "Local Notice to Mariners," in the local press, and by radio from time to time the schedule of use of the area, and shall station patrol boats to warn vessels during periods of use.

(4) This section shall be enforced by the Commander, Tactical Air Command, Langley Air Force Base, Va., or such agency as he may designate.

(c) **Disestablishment of danger zone.** The danger zone will be disestablished not later than December 31, 1967, unless written application for its continuance shall have been made to and approved by the Secretary of the Army prior to that date.

**§ 204.50 Chesapeake Bay off Fort Monroe, Va.; restricted area. U.S. Naval Base and Naval Ordnance Laboratory.** (a) **The danger zone.** Beginning at latitude 37°00'30", longitude 76°18'05"; thence to latitude 37°00'38", longitude 76°17'42"; thence to latitude 37°01'00", longitude 76°17'15"; thence to latitude 37°01'00", longitude 76°16'11"; thence to latitude 36°59'43", longitude 76°16'11"; thence to latitude 36°59'18", longitude 76°17'52"; thence to latitude 37°00'05", longitude 76°18'17"; and thence north along the seawall to the point of beginning.

(b) **The regulations.** (1) Anchoring, trawling, fishing, and dragging are prohibited in the danger zone, and no object, either attached to a vessel or otherwise, shall be placed on or near the bottom.

(2) This section shall be enforced by the Commander, Naval Base, Norfolk, Va., and such agencies as he may designate.

**§ 204.51 Chesapeake Bay, Lynnhaven Roads; danger zones, U.S. Naval Amphibious Base.** (a) **Underwater demolitions area (prohibited)—(1) The area.** A portion of the restricted area for Navy amphibious training operations described in § 207.157, along the south shore of Chesapeake Bay, bounded as follows: Beginning at a point on the mean low-water line at longitude 76°08'59"; thence 200 yards to latitude 36°55'36", longitude 76°08'57"; thence 400 yards to latitude 36°55'34", longitude 76°08'43"; thence 200 yards to a point on the mean low-water line at longitude 76°08'45"; and thence approximately 400 yards along the mean low-water line to the point of beginning. The area will be marked by range poles set on shore on the prolongation of the lines forming its eastern and western boundaries.

(2) **The regulations.** Vessels other than those owned and operated by the United States shall not enter the prohibited area at any time unless authorized to do so by the enforcing agency.

(b) **Small-arms firing range—(1) The Area.** Beginning at a point on the shore line at latitude 36°55'27", longitude 76°08'38"; thence to latitude 36°55'50", longitude 76°08'37"; thence to latitude 36°57'11", longitude 76°08'11"; thence to latitude 36°56'53", longitude 76°07'18"; thence to latitude 36°55'39", longitude 76°07'46"; thence to latitude 36°55'22", longitude 76°08'17"; thence along the shore line to the point of beginning.

(2) **The regulations.** (i) Passage of vessels through the area will not be prohibited at any time, nor will commercial fishermen be prohibited from working fish nets within the area. No loitering or anchoring for other purposes will be permitted.

(ii) A large red warning flag will be flown on shore during period when firing is in progress. Observers will be on duty and firing will be suspended for the passage of vessels and for the placing and maintenance of fish nets within the area.

(c) This section shall be enforced by the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Virginia.

## PART 207—NAVIGATION REGULATIONS:

**§ 207.70 Channel of Tuckerton Creek, N.J.; navigation.** (a) Power boats or other vessels propelled by machinery shall not proceed at any time within the limits of these waters at a greater speed than 8 statute miles per hour.

**§ 207.80 Channel of Christina River, Del.; navigation.** (a) That vessels of over 20 tons capacity, propelled by machinery, shall not proceed at any time within the limits of these waters at a greater speed than 8 statute miles per hour.

**§ 207.90 Delaware River, Pa.; use of Government landing pier at Marcus Hook.** (a) This wharf must not be used for storage of material. A clear, unobstructed passageway not less than 14 feet wide must be left at the wharf approach.

(b) The dragging of any heavy articles over or along the wharf is not allowed, nor the dragging of one end of a log or timber the other end of which is carried on trucks.

(c) No load exceeding 1½ tons, exclusive of wagon and team, is allowed to cross the bridge without permission of the officer in charge.

(d) Anyone violating paragraphs (a) to (c) of this section or committing any other acts of carelessness or violence which results in injuring the wharf will be reported to the United States district attorney for prosecution as provided by law.

**§ 207.100 Inland waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal); use, administration, and navigation.** These regulations are given in the description of the canal in chapter 7 of this Coast Pilot.

**§ 207.105 Delaware Bay off Cape Henlopen, Del.; naval restricted area.** (a) **The area.** Beginning at a point on the south shore of Delaware Bay at longitude 75°06'12"; thence to latitude 38°47'25", longitude 75°06'20"; thence to latitude 38°47'48", longitude 75°06'00"; thence to latitude 38°50'43", longitude 75°02'11"; thence to latitude 38°49'16", longitude 74°59'35"; thence to a point on the shore at latitude 38°46'09"; thence northwesterly and southwesterly along the shore at Cape Henlopen to the point of beginning.

(b) **The regulations.** (1) Anchoring, trawl fishing, crabbing, dragging, grappling, and towing with hawser on bottom are prohibited in the area and no object attached to a vessel shall be placed on or near the bottom.

(2) This section does not apply to anchored floating navigational aids or to placement or removal of such aids by the Coast Guard.

(3) This section does not apply to vessels engaged in commercial or pleasure boat fishing provided anchors, trawls, and ground tackle are not used.

(4) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

**§ 207.110 Magothy River, Md.; speed.** No boat shall at any time proceed at a greater speed than eight statute miles per hour in that portion of the Magothy River between Gibson Island Beach and a line extending

due north from the most northerly part of Holland Point and crossing the Magothy Narrows.

**§ 207.115 Chesapeake Bay near Annapolis, Md.; seaplane restricted areas.** (a) **The areas—**(1) **North area.** The waters of Chesapeake Bay bounded as follows: Beginning at the southernmost tip of Greenbury Point; thence southerly to Greenbury Point Shoal Light; thence 90° true to longitude 76°25'; thence due north to an east-west line tangent to Hackett Point; thence 270° true along said east-west line to the shore at the Naval Radio Station; and thence southerly along the shore to the point of beginning.

(2) **South area.** The waters of Chesapeake Bay bounded as follows: Beginning at the easternmost tip of Tolly Point; thence southeasterly to Tolly Point Shoal Lighted Bell Buoy 33; thence 180° true to an east-west line passing through the southeasternmost tip of Thomas Point; thence 270° true along said east-west line to Thomas Point; and thence northeasterly to the point of beginning.

(b) **The regulations.** (1) Only one of the areas will be used for practice landings during any period. The north area will normally be used except when firing practice is being conducted at the Naval Academy Rifle Range. Such firing practice is generally conducted during the summer months, and at such times the south area will be used for practice landings.

(2) Within the area selected for practice landings, such operations will be confined during any period to a landing strip one mile long and one-fourth mile wide. This landing strip will be laid out, so far as the wind direction will permit, in such manner as to cause the least possible interference with commercial fishing and navigation, and will be patrolled during practice landings.

(3) Vessels will be permitted to pass through either area, including the landing strip, at any time, but they shall give seaplanes using the landing strip the right-of-way. Vessels shall not moor or anchor or otherwise delay their progress within the landing strip when informed by naval personnel assigned to patrol the landing strip that it is in use.

(4) Fixed fishing nets supported on stakes in accordance with Department of the Army regulations governing such structures may be placed in the areas without restriction. Unattended anchored or buoyed nets or other apparatus used for the purpose of taking sea food, except fixed fishing nets supported on stakes, may be placed in or permitted to enter the areas but only at the owners' risk, and the United States shall not be liable for any accidental damage thereto resulting from seaplane operations.

(5) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, United States Naval Academy, Annapolis, Maryland, and such agencies as he may designate.

§ 207.116 **Severn River at Annapolis, Md.; experimental test area, U.S. Navy Marine Engineering Laboratory.** (a) **The restricted area.** The waters of Severn River shoreward of a line beginning at the southeasternmost corner of the U.S. Navy Marine Engineering Laboratory sea wall and running thence southwesterly perpendicular to the main Severn River channel, approximately 560 feet, thence northwesterly parallel to and 50 feet shoreward of the edge of the channel, 1,035 feet, and thence northeasterly perpendicular to the channel, approximately 600 feet, to the shore. Spar buoys will mark the corners of the area adjacent to the channel.

(b) **The regulations.** (1) No vessel or person other than specifically authorized military and naval vessels and persons shall enter or remain in the area during its use for experimental purposes. At all other times vessels and persons may use the area without restriction.

(2) The area will be in use intermittently, and this use will be signified by the presence of white-painted boats or floats, which will be lighted at night.

(3) Upon observing the boats or floats referred to in subparagraph (2) of this paragraph, or upon being warned, vessels and persons shall immediately vacate the area and remain outside the area during the period of use.

(4) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, and such agencies as he may designate.

§ 207.120 **South River, Md., and its tributaries; speed.** No boat shall at any time between May 1, and September 15, inclusive, proceed at a greater speed than eight statute miles per hour in that portion of the South River above the Maryland State Roads Commission bridge at Edgewater, Maryland, or in the tributaries emptying therein, including Warehouse, Gingerville, Beards, and Broad Creeks.

§ 207.125 **Patuxent River, Md.; restricted areas, U.S. Naval Air Test Center, Patuxent River, Md.** (a) Except in the gut off the tip of Point Patience, no person in the water and no craft shall approach closer than 75 yards to the beaches, shoreline, or piers of the area formerly occupied by the U.S. Naval Mine Warfare Test Station, or of U.S. Naval Air Station property. A person in the water or a civilian craft shall not approach rafts, barges, or platforms closer than 100 yards.

(b) Diving tenders will exhibit a square red flag with white X when underwater diving takes place from naval small craft. At such times, persons in the water and civilian craft shall stay at least 200 yards clear of these vessels and the civilian craft shall proceed at a speed not greater than five knots when within 1,000 yards thereof.

(c) On occasions, seaplane landings and takeoffs will be practiced in the seadrome area north of the U.S. Naval Air Station, Patuxent River. This area includes those waters of the Patuxent River between Town Point and Hog Point shoreward of a line described as follows: Be-

ginning at a point on the shore just west of Lewis Creek, bearing 161°30' true, 2,000 yards from Point Patience Light; thence to a point bearing 130° true, 1,850 yards from Point Patience Light; thence to a point bearing 247°30' true, 3,650 yards from Drum Point Light; thence to a point bearing 235° true, 2,060 yards from Drum Point Light; thence to a point bearing 129° true, 700 yards from Drum Point Light; thence to a point bearing 137° true, 1,060 yards from Drum Point Light; and thence to a point on the shore west of Harper Creek entrance, bearing 158°30' true, 1,900 yards from Drum Point Light.

Operations will be indicated by day by a square white flag with square blue center, and by night by one green light for operations in an easterly direction, or by two verticle green lights for operations in a westerly direction, all signals to be exhibited from Patuxent River Boathouse seawall at the U.S. Naval Air Test Center. In addition, crash boats will patrol the landing lanes during the operations, and by night float lights will mark the landing lanes. At such times as the above signals are exhibited the following restriction will apply to boating and to persons in the waters adjacent to the U.S. Naval Air Station in the area westward of Fishing Point: Persons in the water and boats will proceed across the seaplane operating area only in accordance with instructions from crash boats; will not enter the seaplane basins; and will not use the areas adjacent to seaplane basins.

(d) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md., and such agencies as he may designate.

§ 207.128 **York River, Va.; naval prohibited and restricted areas.** (a) **The areas—(1) Naval mine service-testing area (prohibited).** A rectangular area surrounding Piers 1 and 2, Naval Weapons Station, and extending upstream therefrom, beginning at a point on the shore line at latitude 37°15'25" N., longitude 76°32'32" W.; thence to latitude 37°15'42" N., longitude 76°32'06" W.; thence to latitude 37°15'27" N., longitude 76°31'48" W.; thence to latitude 37°15'05" N., longitude 76°31'27" W.; thence to a point on the shoreline at latitude 37°14'51" N., longitude 76°31'50" W.; and thence along the shoreline to the point of beginning.

(2) **Naval mine service-testing area (restricted).** A rectangular area adjacent to the northeast boundary of the prohibited area described in subparagraph (1) of this paragraph, beginning at latitude 37°16'00" N., longitude 76°32'29" W.; thence to latitude 37°16'23" N., longitude 76°32'00" W.; thence to latitude 37°15'27" N., longitude 76°30'54" W.; thence to latitude 37°15'05" N., longitude 76°31'27" W.; thence to latitude 37°15'27" N., longitude 76°31'48" W.; thence to latitude 37°15'42" N., longitude 76°32'06" W.; thence to latitude 37°15'40" N., longitude 76°32'09" W.; and thence to the point of beginning.

(3) **Naval anchorage area (restricted).** Between Tue Marshes Light and Yorktown, beginning at latitude 37°14'57", longitude 76°23'03.5", thence to latitude 37°14'27", longitude 76°23'03"; thence to latitude 37°13'54".

longitude 76°25'39"; thence to latitude 37°13'42.5", longitude 76°27'40.5"; thence to latitude 37°14'11", longitude 76°29'11.5"; thence to latitude 37°14'23", longitude 76°29'11.5"; thence to latitude 37°14'22.5", longitude 76°25'43.5"; and thence to the point of beginning including an Explosives-Handling Berth (Naval) partially within the limits of the naval anchorage covering a circular area of 600 yards radius with its center at latitude 37°13'56" N., longitude 76°28'48" W.

(b) **The regulations.** (1) All persons and all vessels other than naval craft are forbidden to enter the prohibited area described in paragraph (a) (1) of this section.

(2) Trawling, dragging, and net-fishing are prohibited, and no permanent obstructions may at any time be placed in the area described in paragraph (a) (2) of this section. Upon official notification, any vessel anchored in the area and any person in the area will be required to vacate the area during the actual mine-laying operation. Persons and vessels entering the area during mine-laying operations by aircraft must proceed directly through the area without delay, except in case of emergency. Naval authorities are required to publish advance notice of mine-laying and/or retrieving operations scheduled to be carried on in the area, and during such published periods of operation, fishing or other aquatic activities are forbidden in the area. No vessel will be denied passage through the area at any time during either mine-laying or retrieving operations.

(3) The naval anchorage and Explosives-Handling Berth described in paragraph (a) (3) of this section are reserved for the exclusive use of naval vessels and except in cases of emergency no other vessel shall anchor therein without the permission of local naval authorities, obtained through the Captain of the Port, U.S. Coast Guard, Norfolk, Virginia. There shall be no restriction on the movement of vessels through the anchorage or the Explosives-Handling Berth.

(4) to (6) Vacant.

(7) Vessels shall not be anchored, nor shall persons in the water approach within 300 yards of the perimeter of the Explosives-Handling Berth when that berth is occupied by a vessel handling explosives.

(8) The regulations of this section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he may designate.

**§ 207.129 York River adjacent to Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia; restricted area.** (a) **The area.** The waters of York River bounded as follows: Beginning at a point on shore at Cheatham Annex Depot at latitude 37°17'14" N., longitude 76°35'38" W.; thence to a point offshore at latitude 37°17'52" N., longitude 76°35'20" W.; thence approximately parallel to the shore to a point at latitude 37°17'23" N., longitude 76°34'39" W.; thence to the shore at latitude 37°16'58" N., longitude 76°35'03" W.; and thence along the shore at Cheatham Annex Depot to the point of beginning.

(b) **The regulations.** (1) No loitering will be permitted within the area. Oystermen may work their own leaseholds or public bottom within the area, provided they obtain special permission from the Officer in Charge, Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia.

(2) The regulations in this section shall be enforced by the Officer in Charge, Cheatham Annex Depot U.S. Naval Supply Center, Williamsburg, Virginia.

**§ 207.130 York Spit Channel, Chesapeake Bay; navigation.** The use of this channel shall be restricted to vessels and other watercraft passing up or down the bay, and no vessel or other watercraft shall cross the channel or enter it at any point other than at its ends and in the direction of its axis. Any vessel having entered the channel shall follow the course thereof for its entire length.

**§ 207.140 Thimble Shoal Channel, Chesapeake Bay; navigation.** (a) The use of this channel shall be restricted to vessels, tows, and other watercraft drawing 20 feet or more at the time of navigating the channel: provided, that the restriction shall not apply to passenger-carrying vessels.

(b) Watercraft permitted to use the channel under paragraph (a) of this section shall proceed through at a reasonable speed so as not to endanger other vessels or interfere with any work in connection with maintaining, surveying, or buoying the channel. Vessels shall not anchor in the channel except in cases of emergency, such as fog or accident, which would render progress unsafe or impossible.

(c) This section shall not be construed as prohibiting necessary use of the channel by Government boats while on Government duty, or its use in emergencies by pilot boats, whether steam or sail, or by police boats.

**§ 207.152 James River off the entrance to Skiffes Creek, Va.; Army smallcraft testing area.** (a) **The restricted area.** Beginning at latitude 37°10'00", longitude 76°37'28"; thence to latitude 37°09'13", longitude 76°37'48"; thence to latitude 37°09'13", longitude 76°38'08"; thence to latitude 37°10'00", longitude 76°37'55"; and thence to the point of beginning.

(b) **The regulations.** (1) No vessels other than Department of the Army vessels and no persons other than persons embarked in such vessels shall enter the restricted area except as provided in subparagraph (2) of this paragraph.

(2) Nothing in this section shall prevent the setting of fish traps within the restricted area under regulations of the Department of the Army, nor will the passage of fishing vessels to and from authorized traps be unreasonably interfered with or restricted.

(3) Vessels anchored in the area shall be so anchored as not to obstruct the arc of visibility of Deep Water Shoals Light.

(4) This section shall be enforced by the Commanding General, Fort Eustis, Virginia, and such agencies as he may designate.

**§ 207.153 Elizabeth River, Southern Branch, Va., naval restricted areas.** (a) **The areas—**(1) **St. Helena Annex Area.** Beginning at a point at St. Helena Annex of the Norfolk Naval Shipyard, on the eastern shore of Southern Branch of Elizabeth River, at latitude 36°49'43'', longitude 76°17'26.5''; thence in a southwesterly direction to a point on the eastern boundary of Norfolk Harbor 40-foot channel at latitude 36°49'42'', longitude 76°17'33''; thence in a southerly direction along the eastern boundary of Norfolk Harbor 40-foot channel to latitude 36°49'28'', longitude 76°17'27''; thence easterly to the shore at latitude 36°49'28'', longitude 76°17'22''; and thence, northerly along the shore to the point of beginning.

(2) **Norfolk Naval Shipyard Area.** Beginning at a point on the shore at the northeast corner of the Norfolk Naval Shipyard, at latitude 36°49'43.5'', longitude 76°17'41.5''; thence due east approximately 100 feet to the western boundary of Norfolk Harbor 40-foot channel; thence in a southerly direction along the western boundary of the channel to latitude 36°48'58'', longitude 76°17'34.5''; thence southwesterly to latitude 36°48'46'', longitude 76°17'43.5''; thence southeasterly to the western boundary of Norfolk Harbor 40-foot channel at the point where it passes through the draw of the Norfolk and Portsmouth Belt Line Railroad bridge; thence in a southwesterly direction along the northerly side of the bridge to the western shore of Southern Branch of Elizabeth River; and thence along the shore in a northerly direction to the point of beginning.

(3) **Southgate Terminal Area.** Beginning at a point at the northeast corner of Southgate Terminal Annex of Norfolk Naval Shipyard, at latitude 36°48'23'', longitude 76°17'39''; thence east to latitude 36°48'23'', longitude 76°17'29''; thence southerly along the western boundary of Norfolk Harbor 35-foot channel to latitude 36°48'04'', longitude 76°17'33''; thence west to latitude 36°48'04'', longitude 76°17'41''; and thence along the shore in a northerly direction to the point of beginning.

(b) **The regulations.** (1) No loitering within the areas will be permitted.

(2) This section shall be enforced by the Commander, Norfolk Naval Shipyard, Portsmouth, Virginia.

**§ 207.154 Southern Branch of Elizabeth River; speed.** In that part of the Southern Branch of Elizabeth River between the junction of the Southern and Eastern Branches of the Elizabeth River and the Norfolk and Portsmouth Belt Line Railroad Bridge, no vessel shall move at a speed exceeding six knots.

**§ 207.155 Hampton Roads off Norfolk Naval Base; Navy restricted areas.** (a) **The areas.** (1) Beginning at a point on the Naval Base shore at latitude 36°56'37.5'',

longitude 76°19'44''; thence westerly and northerly along the breakwater to its extremity at a point at latitude 36°56'41.5'', longitude 76°19'54''; thence westerly to latitude 36°56'41.5'', longitude 76°20'05.5''; thence northerly along the eastern limit of Norfolk Harbor Channel to latitude 36°57'52'', longitude 76°20'00''; thence easterly to latitude 36°57'52'', longitude 76°19'35''; thence to latitude 36°57'47.7'', longitude 76°18'57''; and thence southerly to a point on shore at latitude 36°57'21.5'', longitude 76°19'04''.

(2) Beginning at a point on the shore at the Destroyer-Submarine Base (Naval Base) at latitude 36°56'00'', longitude 76°19'30''; thence westerly to latitude 36°55'59'', longitude 76°20'08.5''; thence northerly along the eastern limit of Norfolk Harbor Channel to latitude 36°56'17.5'', longitude 76°20'07''; and thence easterly to a point on shore at latitude 36°56'19'', longitude 76°19'46.5''.

(b) **The regulations.** (1) No vessels other than Naval vessels and other vessels authorized to move to and from piers at the Norfolk Naval Base, and no person other than persons embarked in such vessels, shall enter the restricted areas.

(2) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

**§ 207.156 Hampton Roads and Willoughby Bay, Norfolk, Va.; seaplane restricted and prohibited areas.**

(a) **The areas—**(1) **The restricted area.** Beginning on the shore of Willoughby Bay at latitude 36°57'17'', longitude 76°18'34.2''; thence to latitude 36°57'29'', longitude 76°19'01''; thence to latitude 36°58'41.5'', longitude 76°18'42''; thence to latitude 36°58'37.5'', longitude 76°18'16''; thence to latitude 36°58'01'', longitude 76°18'23''; thence to latitude 36°57'48'', longitude 76°18'07.5''; thence to latitude 36°57'45.3'', longitude 76°17'58.5''; thence to latitude 36°57'35'', longitude 76°17'08''; thence to latitude 36°57'26.2'', longitude 76°16'26.2''; thence generally south and west along a line 50 yards from and parallel to the shore to latitude 36°56'48.5'', longitude 76°17'17.5''; thence to latitude 36°57'02'', longitude 76°17'58''; thence to latitude 36°57'23.8'', longitude 76°18'01''; thence to latitude 36°57'22.2'', longitude 76°18'28.5''; thence to the point of beginning.

(2) **The prohibited area.** Beginning 50 yards off shore in Willoughby Bay at latitude 36°57'26.2'', longitude 76°16'26.2''; thence generally south and west along a line 50 yards from and parallel to the shore to latitude 36°56'48.5'', longitude 76°17'17.5''; thence to latitude 36°57'02'', longitude 76°17'58''; thence to latitude 36°57'23.8'', longitude 76°18'01''; thence to latitude 36°57'22.2'', longitude 76°18'28.5''; thence to the shore at latitude 36°57'17'', longitude 76°18'34.2''; thence along the shore of Willoughby Bay generally eastward to latitude 36°57'25'', longitude 76°16'23''; and thence 50 yards westward to the point of beginning.

(b) **The regulations.** (1) Persons may not enter and vessels may not operate in the prohibited area except on authorization of the Commanding Officer, Naval Air Station, Norfolk, Va.

(2) Intent to conduct seaplane operations in the restricted area will be indicated by any or all of the following: Crashboats showing flashing lights, sounding sirens, or hailing by voice; illumination of seadrome markers and float lights; or "buzzing" by low-flying aircraft. Whenever any of the above-named signals are observed by persons and vessels in the restricted area, they shall carry out such instructions as may be given by Naval crashboat personnel, clear the area promptly, and remain clear until seaplane operations are terminated. Persons and vessels shall give seaplanes the right-of-way in the restricted area.

(3) When seaplane operations are not in progress in the restricted area, vessels may operate therein.

(4) No fishing structures or other fixed apparatus related to the taking of seafood are permitted in the restricted area.

(5) The regulations in this section shall be enforced by the Commandant, Fifth Naval District, Norfolk, Virginia, and such agencies as he may designate.

**§ 207.157 Chesapeake Bay, Lynnhaven Roads; Navy amphibious training area.** (a) **The restricted area.** Beginning at latitude 36°55'47'', longitude 76°11'04.5''; thence to latitude 36°59'04'', longitude 76°10'11''; thence to latitude 36°58'28.5'', longitude 76°07'54''; thence to latitude 36°55'27.5'', longitude 76°08'42''; thence westerly along the shore and across the mouth of Little Creek to the point of beginning.

(b) **The regulations.** (1) No fish-pound stakes or structures shall be allowed in the restricted area.

(2) No vessel shall approach within 300 yards of any naval vessel or within 600 yards of any vessel displaying the red "baker" burgee.

(3) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

**§ 207.157a Little Creek, Va.; speed.** No vessel shall proceed at a speed exceeding five knots in that part of Fishermans Cove (Northwest Branch of Little Creek) between the highway bridge on U.S. Route 60 and the mouth of the Cove.

**§ 207.158 Chesapeake Bay entrance; naval restricted area.** (a) **The area.** Beginning at a point on the south shore of Chesapeake Bay at longitude 76°03'06''; thence to latitude 37°01'18'', longitude 76°02'06''; thence to latitude 37°00'18'', longitude 75°55'54''; thence to latitude 36°58'00'', longitude 75°48'24''; thence to latitude 36°51'48'', longitude 75°51'00; thence to the shore at longitude 75°58'48'', and thence northwesterly and southwesterly along the shore at Cape Henry to the point of beginning.

(b) **The regulations.** (1) Anchoring, trawling, crabbing, fishing, and dragging in the area are prohibited, and no object attached to a vessel or otherwise shall be placed on or near the bottom.

(2) This section shall be enforced by the Commandant, Fifth Naval District, Norfolk, Va.

**§ 207.900 Restricted areas in vicinity of Maritime Administration Reserve Fleets.** (a) The regulations in this section shall govern the use and navigation of waters in the vicinity of the following National Defense Reserve Fleets of the Maritime Administration, Department of Commerce:

(1) Hudson River Reserve Fleet, Jones Point, New York.

(2) James River Reserve Fleet, Fort Eustis, Virginia.

(3) Wilmington Reserve Fleet, Brunswick River near Wilmington, North Carolina.

(4) Mobile Reserve Fleet, Tensaw River near Bay Minette, Alabama.

(5) Beaumont Reserve Fleet, Neches River near Beaumont, Texas.

(6) Suisun Bay Reserve Fleet near Benicia, California.

(7) Astoria Reserve Fleet, Cathlamet Bay near John Day Point, Oregon.

(8) Olympia Reserve Fleet, Budd Inlet at Olympia, Washington.

(b) No vessels or other watercraft, except those owned or controlled by the United States Government, shall cruise or anchor between Reserve Fleet units, within 500 feet of the end vessels in each Reserve Fleet unit, or within 500 feet of the extreme units of the fleets, unless specific permission to do so has first been granted in each case by the enforcing agency.

(c) The regulations in this section shall be enforced by the respective Fleet Superintendents and such agencies as they may designate.

### 3. SANDY HOOK TO CAPE HENRY

Between New York Bay and Delaware Bay is the New Jersey coast with its many resorts, its inlets, and its Intracoastal Waterway. Delaware Bay is the approach to Wilmington, Philadelphia, and Trenton; below Wilmington is the Delaware River entrance to the Chesapeake and Delaware Canal, the deep inside link between the two great bays. The Delaware-Maryland-Virginia coast has relatively few resorts; the numerous inlets are backed by a shallow inside passage that extends all the way from Delaware Bay to Chesapeake Bay. The last seven chapters, nearly half of this book, are required to describe Chesapeake Bay to Norfolk and Newport News, to Washington and Baltimore, and to Susquehanna River 170 miles north of the Virginia Capes.

A vessel approaching this coast from seaward will be made aware of its nearness by the number of vessels passing up and down in the coastal trade. The coast of New Jersey is studded with large hotels, prominent standpipes, and elevated tanks. South of Delaware Bay, the principal landmarks are the lighthouses and Coast Guard stations.

The general tendency along this mostly sandy coast is for the ocean beaches and the points on the north sides of the entrances to wash away and for the points on the south sides of the entrances to build out. Protective works have done much to stabilize the New Jersey coast, but several lighthouses have been abandoned between Delaware Bay and Chesapeake Bay because of erosion.

The shores of Delaware Bay and Delaware River are mostly low and have few conspicuous marks, other than lights, below the industrial centers along the river. The shores of Chesapeake Bay are low as far north as Patuxent River, then rise to considerable heights at the head of the bay.

**Boundary lines of inland waters.**—At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described, **Inland Pilot Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Pilot Rules** apply outside the aids. Specific lines are described in **Part 82**, chapter 2.

**Control over movement of vessels.**—See **Part 124**, Chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.

**Channels.**—**Federal project depth** is the dredging depth of a channel as authorized by an Act of Congress upon recommendation of the Chief of Engineers, U.S. Army. **Controlling depth** in a channel is its least depth; it restricts use of the channel to drafts less than that depth.

Where deepwater channels are maintained by the Corps of Engineers and the controlling depths are printed on the charts in tabular form, the Coast Pilot gives only the project depths. Owing to constant shoaling in places, depths may vary considerably between maintenance dredgings; consult the Notice to Mariners for channel depths subsequent to charted information.

Where secondary channels are maintained regularly by the Corps of Engineers, the Coast Pilot gives the controlling depths together with the dates of the latest surveys.

In the case of other channels, the controlling depths printed in the Coast Pilot are from the latest available reports which may, however, be several years old.

The channels into Delaware and Chesapeake Bays are broad and deep. The entrances to the inlets are comparatively shallow and are more or less obstructed by shifting sandbars. Some of the inlets have been improved by dredging and by the construction of jetties. On many of the bars the buoys are moved from time to time to mark the shifting channels. The best time to enter most of the inlets is on a rising tide with a smooth sea.

**Anchorage.**—The only protected anchorage for deep-draft vessels between New York Bay and Chesapeake Bay is outside the channel limits in Delaware Bay according to draft. Absecon Inlet, Cape May Inlet, and some of the others can accommodate light-draft vessels such as trawlers and small yachts, but not medium or deep drafts. Small local craft often seek shelter inside the shallower inlets, but entrance is difficult in heavy weather, and the unimproved inlets are often difficult even in good weather, particularly for strangers.

**Dangers.**—The principal dangers along this coast are the outlying sand shoals, the fogs, and the doubtful direction and velocity of the currents after heavy gales. Depths of 7 fathoms are found as far as 13 miles from shore. There are many wrecks along this coast, but most of them have been blasted off or cleared to safe navigational depths; the others are marked by obstruction buoys.

Gales from northeast to southeast cause heavy breakers on the beaches and outlying shoals; the sea breaks in 4 to 5 fathoms of water, and shoals of that depth or less usually are marked during easterly gales. The bars across the inlets are then impassable and are defined by breakers even in comparatively smooth water with a light swell. The heaviest surf on the beach is on a rising tide near high water springs; the least surf is encountered on a falling tide near low water. A very heavy surf makes

on the beaches after a southeasterly gale followed by a sudden shift of wind to northwest.

**Fishweirs** are numerous along the outside coast and in Chesapeake Bay and tributaries. The stakes often become broken off and form a hazard to navigation, especially at night. Regulations limiting the areas within which fishweirs may be established have been prescribed by the Chief of Engineers, U.S. Army. The areas within which fishweirs are permitted are shown on charts of 1:80,000 scale and larger. The exact locations of the weirs within the designated areas are not shown.

Along the outer coasts the limits of fishweir areas are not marked. In Chesapeake Bay and tributaries, black and white horizontal-banded buoys mark the turns of the limits. Strangers should proceed with caution when crossing areas of possible fishweirs, and should avoid crossing such areas at night.

**Tides.**—The mean range of tide is 3.5 to 4.5 feet along the coast. In passages away from the inlets, the range may be as little as 0.5 foot. In Delaware River the mean range reaches 6.8 feet at Trenton, while in Chesapeake Bay the mean range is only 1.1 feet at Baltimore.

**Currents.**—Rotary currents and Gulf Stream currents could be discussed at considerable length, but the important currents are those in the inlets and the inside passages; the tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind.

**WEATHER.**—The Appendix includes climatological tables for 10 Atlantic coast places and a table of fog-signal operation. Also listed are Weather Bureau offices, storm warning stations, and radio stations which transmit weather information.

**General.**—The area covered in this Coast Pilot is generally low and flat. Long stretches of sandy beaches and tidewater marshes characterize the New Jersey, Delaware, and Maryland ocean coasts. The eastern shore of Chesapeake Bay consists of low, flat, almost featureless plains, with numerous irregularities and small islands. The western shore is a gently rolling upland. Tidewater Virginia encompasses numerous flat peninsulas, wide estuaries, and many swamps. Topography farther inland rises in an irregular pattern of progressively higher northeast-southwest mountain ranges to the main Appalachian Mountains. Although some distance from the ocean, this mountain barrier exerts an important influence on the winter climatic pattern in the coastal area; it partly blocks the cold continental air from the interior, and this combines with the moderating effect of the ocean to produce a more equable climate than is found in continental locations in the same latitude elsewhere.

The general surface wind pattern along the Atlantic coast is controlled largely by the position and intensity of the Bermuda-Azores high-pressure system. The characteristics and location of this extensive High vary considerably during the year. In the winter, it usually is centered far to the southeast. The major low-pressure

storm systems, which develop over the interior, the Gulf of Mexico, and off the southeastern coast, may sweep through the Middle Atlantic States. These extratropical cyclones usually travel between north and east-northeast, and many are intense and severe, accompanied by strong gusty winds and rain or snow.

Highs from the interior usually follow the passage of these Lows, producing a pattern of rapidly changing air masses and variable winter weather conditions. There are marked temperature fluctuations and an alternation of brief stormy periods with clear crisp days and relatively mild weather.

In the spring, the Bermuda-Azores High, although still centered far to the southeast, begins to affect the southeastern States. The Middle Atlantic area usually is located outside the high-pressure circulation, however, and is still subject to the passage of extratropical cyclones, frontal activity, and changing air masses. Warm spells, sometimes with abundant rain, alternate with cool, dry weather.

In the summer, the Bermuda-Azores High reaches its most northerly and westerly position, embracing the entire eastern seaboard within its circulation. The strength of this circulation is moderate but persistent, sufficiently so to hold back the eastward movement of the continental low-pressure system. As a consequence, the daily weather along the coast may not change much for several weeks at a time; it is controlled by the southerly and southwesterly winds bringing moist, warm air from the Gulf. This weather is characterized by frequent instability showers and thunderstorms, uniformly warm temperatures and high humidity, and relatively low wind speeds. However, the summer months also include the beginning of the hurricane season.

In the autumn, the Bermuda-Azores High again shifts southward and eastward, leaving the Atlantic coast in a weak continental high-pressure area. This gradually gives way to the winter weather pattern, bringing increased frontal activity and more frequent passage of cyclones and anticyclones.

**Pressure.**—The pressure pattern changes considerably from summer to winter. At individual stations along the coast, however, the differences of mean annual pressure are quite small. The highest monthly mean pressure occurs during the winter and the lowest in late spring and early summer. Large short-term variations of pressure are occasionally experienced during tropical cyclones in the late summer and autumn, and during the movement of extratropical cyclones and anticyclones in the winter and spring. The day-to-day changes of pressure in summer are less marked, and average lower than in winter.

**Winds.**—Prevailing winds at most stations are from northwest during the cooler months, October through March, and from the southwest, May through September. The average wind speeds during the warmer months are generally lower than during the colder seasons, because of the absence of extratropical cyclones. Highest average speeds occur in March and lowest in August.

In the winter, the winds over the open ocean are slightly stronger than those over land. Little difference is apparent in summer. In the warmer season, a daily shift in wind direction occurs when the region is not under the influence of cyclonic storms. During the warmer part of the day winds blow onshore, and during the cooler part, offshore. This land-sea breeze seldom penetrates more than a few miles inland.

Gales (force 8 or higher) are reported in about 6 percent of ships' observations in winter. Gales are generally from the westerly quadrants. Summer gales are rare, but may be encountered during tropical cyclones or local thunderstorms.

**Temperatures.**—Along the Middle Atlantic Coast temperatures are generally moderate. Mean annual temperatures range from 53.5° F. at Philadelphia to 59.7° F. at Norfolk. The lowest mean monthly temperature is 32.3° F. at Philadelphia in January; the highest, 79.1° F. at Baltimore in July. January is the coldest month and July the warmest. Over the open water areas, January mean air temperatures may be several degrees warmer than at coastal points, and in July they may be a few degrees cooler. Over land surfaces, the air warms and cools readily, but over water it does so slowly and relatively little. Land surfaces absorb heat in only a thin surface layer and give it up freely, while water absorbs heat to substantial depths and retains it longer.

The daily temperature range averages from 10° to 20° F. throughout the year, and is generally much less over the water. Readings in the coastal areas rarely exceed 100° F. and the 90° level is reached on only one-third to one-half of the days during summer. Freezing temperatures are probable on one-half or more of the days from November through March, except from Maryland southward where the average is about one in three. Below-zero readings have been recorded during December, January, and February at most stations, except Norfolk where no reading below 2° F. has ever been observed.

Sea-surface temperatures are warmer than air temperatures most of the time, ranging from 4° to 7° F. warmer in winter to about the same temperature in the spring.

**Relative humidity.**—Throughout the year the relative humidity is high, averaging from 64 to 90 percent at 7 a.m. and from 46 to 62 percent at 7 p.m. Humidities usually are higher with onshore winds (blowing from sea toward land) and lower with offshore winds (blowing from land toward sea).

**Cloudiness and precipitation.**—At sea in winter, overcast conditions (cloud amount 0.8 or more) are recorded in 45 to 50 percent of observations, while clear conditions (0.2 or less) are recorded in about 30 percent. In summer, some 30 to 35 percent of observations show overcast and an equal percent, clear skies. The least cloudiness occurs when the air is dominated by the Bermuda-Azores High in late summer and early autumn, and the greatest cloudiness during the frequent winter cyclones. In the coastal area, from one-third to one-half the days are overcast in winter, and 25 to 35 percent in summer.

Precipitation over the coastal sections is moderately heavy and well distributed. Normal monthly totals vary from minima of about 2.5 to 3.0 inches in February or October to maxima of 4.5 to 6.0 inches in August. Annual totals range between 41 and 45 inches. Summer thunderstorms are most frequent over land and near coastal waters in the afternoon; at night they are more frequent over open water. Thunderstorm rainfall is less intense over the ocean, but can severely restrict visibility. Snow may be expected from November through March, maximum fall being in January and February. Snow usually does not remain on the ground for extended periods. On rare occasions, freezing rain, or glaze, is encountered; if prolonged, it can cause damage to rigging. Snow at sea is little more than a severe restriction to visibility.

**Visibility.**—Although generally good along these coastal States, visibility at any time can be hampered by smoke, haze, fog, and precipitation. The frequency of days with visibility less than 500 yards is 4 to 12 percent annually, mostly during the winter. Over the ocean areas, the percentage frequency of days with visibility less than 5 miles ranges from 5 to 15 percent in the southerly sections to around 20 to 30 percent in the northerly. Advection sea fog occasionally drifts onshore in the warmer months, burning off from the surface and usually lifting by afternoon. This process is reversed over the water area where fog usually dissipates from the top downward. Very shallow steam fog is sometimes experienced in the winter. This fog type, which occurs only in very cold weather when the air is much colder than the water, may hide the hull of a ship while leaving the masts and upper rigging plainly visible.

Fog is more likely to form with light to moderate winds. The most frequent wind forces accompanying heavy sea fog are 2 to 4. Fog rarely forms or persists with gale force winds.

**Tropical cyclones.**—Hurricanes and tropical storms occur from June through November in the Middle Atlantic coast area. The centers of these storms generally move through this region on a northward or northeastward direction, either offshore or through the coastal area. As a general rule, tropical cyclones are much more violent than extratropical lows of the same season. Most tropical cyclones begin to acquire extratropical characteristics in this region, so that although the maximum winds near the center may be lower than in more southerly latitudes, the area covered by gale winds may be larger. Considerable damage has been caused to shore property from high tides and winds and to vessels off the coast.

**HURRICANES.**—Severe tropical cyclones of the North Atlantic Ocean are ordinarily referred to as West Indian Hurricanes, though actually many of these storms form, move, and die far out from the mainland and hundreds of miles from the West Indies. As a general rule these storms move with the prevailing winds of the area. In small hurricanes the diameter of the area of destructive winds may not exceed 25 miles while in some of the

greater storms the diameter may be as much as 400 to 500 miles.

At the center is a comparative calm known as the "eye of the storm." The diameter of this "eye" varies with individual storms and may be as little as 7 miles but is rarely more than 30 miles. The average is 15 to 20 miles. This center is the region of low atmospheric pressure around which winds blow in a more or less circular course, spiraling inward in a counterclockwise direction. Winds at the outer edge of the storm area are light to moderate and gusty, and often increase toward the center to speeds too high for instrument recording. Although the air movement near the center of the hurricane is usually light and fitful, the seas in this area are in most cases very heavy and confused, rendered so by the violent shifting winds which surround it. Furthermore, after the center has passed a vessel, she may expect a sharp renewal of the gales, with winds from a more or less opposite direction. The fully developed tropical cyclone may affect an area covering tens of thousands of square miles.

Tropical cyclones occur over all the tropical oceans except the South Atlantic. They usually form in the tropical regions of the easterly trade winds. In the North Atlantic, hurricanes form over a wide range of ocean between the Cape Verde Islands and the Windward Islands, over the western part of the Caribbean Sea, and the Gulf of Mexico. While some may initially move northward, especially those that form southeast of Bermuda, the majority take a westerly to northwesterly course. Of these, some curve gradually northward, either east of or above the larger islands of the West Indies, then turn northeastward or eastward for varying distances from the Atlantic coast of the United States. Others pass over or to the south of the larger islands and enter the Gulf of Mexico, then curve northward or northeastward and strike some part of the east Gulf coast. Others may continue westward and strike the west Gulf coast.

The most common path is curved, the storms moving generally in a westward direction at first, turning later to the northwestward and finally to the northeastward. A considerable number, however, remain in low latitudes and do not turn appreciably to the northward. Freak movements are not uncommon, and there have been storms that described loops, hairpin-curved paths, and other irregular patterns. Movement toward the southeast is rare, and in any case of short duration. The entire Caribbean area, the Gulf of Mexico, the coastal regions bordering these bodies of water, and the Atlantic coast are subject to these storms during the hurricane season.

Tropical cyclones can be expected from May through November. However, the months of greatest frequency are August, September, and October, when hurricanes are most likely to be severe. During all of the season the chance of an intense storm developing is great enough to warrant careful watch of the weather elements in this area. The June hurricanes which form in the West

Indian region usually move in a direction between west and north while they are south of 25° N. In late September, October, and November, hurricanes of this region are more likely to move in a direction between north and east, passing through the Yucatan Channel, or over Cuba, Florida, or the Bahamas. Of the hurricanes that come from the Atlantic into the West Indies, the majority occur in August and September. They generally move on a west-northwesterly course in low latitudes, some reaching the coast before curving toward the north and northeast. Late in the season, October or November, the movement of hurricanes that form east of the West Indies is often toward the north in the open Atlantic.

The average speed of movement of West Indian Hurricanes in the tropics is about 10 to 15 knots. This speed, however, varies considerably according to the location of the storm, its development, and attendant meteorological conditions. The highest rates of progression usually occur when the storm is moving northward or northeastward in the middle or higher latitudes.

**Signs of approach.**—One of the earliest signs of a hurricane is the appearance of high cirrus clouds which converge toward a point on the horizon that indicates the direction of the center of the storm. The snow-white fibrous mares' tails appear when the center is about 300 or 400 miles distant. Another usual early indication is a long, heavy swell propagated to a considerable distance, sometimes 2 or 3 days in advance, when there is no intervening land to interrupt it. This swell comes from the general direction in which the storm is approaching. There is usually a slight rise of the barometer at the outset, followed by a continuous fall. In front of the storm, if it is advancing in some westerly direction toward the observer, the winds blow from a northerly point (northeast, north, or northwest); if in some northerly direction toward the observer, they will blow from an easterly point (southeast, east, or northeast). A further indication is a rough, increasing sea. If one or more of these signs is lacking, there is little cause for anticipating a hurricane.

As the storm center approaches, the barometer continues to fall. The wind increases in speed and blows in heavy squalls, and the changes in its direction become more rapid. When facing the wind, the observer will find that the wind, in general, will back to the left during this time if the center is moving toward his left, or veer to the right if moving toward his right. Rain in showers accompanies the squalls, and when the center comes closer the rain is usually continuous and is attended by furious gusts of wind. The air is thick with rain and spume drift. Objects at a short distance are often hardly visible. If a vessel is on the line of the hurricane's advance, the wind will remain from the same direction, or nearly so, until the center is close to the vessel, or upon her.

**Distance of hurricane center.**—The distance from the center of a hurricane can be estimated from a consideration of the height of the barometer and the rapidity of its fall, and the velocity of the wind and the rapidity of its

changes in direction. If the barometer falls slowly and the wind increases gradually, it may reasonably be supposed that the center is at a considerable distance. With a rapidly falling barometer and increasing winds, it may reasonably be supposed that the center is approaching dangerously near, the more so if the winds blow closely from the direction of the increasing swell.

**Bearings of center.**—If an observer faces the wind, the storm center will likely be located 8 to 12 points to the right in the northern hemisphere. When the storm is distant it may be 10 to 12 points, and when the barometer has fallen 5 or 6 tenths of an inch it may be nearer 8 points.

A line drawn through the center of a hurricane in the direction in which it is moving is called the storm track, or axis of progression. The semicircle on either side of the axis is called, respectively, the right-hand or dangerous semicircle and the left-hand or navigable semicircle.

If the wind shifts to the right, the vessel will be in the right-hand or dangerous semicircle with regard to the direction in which the storm is traveling. In such case the vessel should be kept on the starboard tack and increase her distance from the center.

If the wind shifts to the left, the vessel will be in the left or navigable semicircle. The helm should be put up and the vessel run with the wind on the starboard quarter, preserving the compass course, if possible, until the barometer rises, when the vessel may be hove to on the port tack. If there is not sea room to run, the vessel can be put on the port tack at once.

Should the wind remain steady and the barometer continue to fall, the vessel is in the path of the storm and should run with the wind on the starboard quarter into the navigable semicircle.

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing. In receding from the center of a hurricane the barometer will rise and the wind and sea will subside.

**Practical rules.**—When there are indications of a hurricane, vessels should remain in port or seek one if possible. Changes in barometer and wind should be carefully observed and recorded, and every precaution should be taken to avert damage by striking light spars, strengthening moorings, and if a steamer preparing steam to assist the moorings. In the ports of the southern states hurricanes are generally accompanied by very high tides, and vessels may be endangered by overriding the wharf where moored if the position is at all exposed.

Vessels in the Straits of Florida may not have sea room to maneuver so as to avoid the storm track, and should try to make a harbor, or to stand out of the straits to obtain sea room. Vessels unable to reach a port and having sea room to maneuver usually observe the following rules:

When there are indications of the near approach of a hurricane, sailing vessels may heave to on the starboard

tack. The safety of the vessel often depends on heaving to in time. Steamers may remain stationary. Both should carefully observe and record changes in wind, barometer, and swell so as to find the bearing of the center, and to ascertain by the shift of the wind in which semicircle the vessel is situated.

**Ice.**—The intracoastal passages of New Jersey, Delaware, and Maryland usually are closed by ice during ordinary winters; the Virginia passages are closed only during severe winters and then only for short periods. Local vessels use all the inlets and adjacent channels from Sandy Hook to Cape Charles all winter, even when through navigation is blocked.

In Delaware River, ice is present in sufficient amounts even in ordinary winters to be of some concern. The Chesapeake and Delaware Canal is kept open as long as possible but may be closed at times. In severe winters, navigation has been interrupted above Chester but ice breakers and large vessels keep the channels open to Philadelphia. Above Philadelphia, the river may be closed for extended periods in January and February, and navigation is practically suspended during severe winters.

Ice seldom interferes with navigation of full-powered vessels in Hampton Roads even in severe winters. Large vessels can always pass up and down Chesapeake Bay, but ice jams are of frequent occurrence off Baltimore Harbor, and the harbor itself freezes over; ice breakers attempt to keep the channels open but navigation is sometimes blocked for limited periods.

Conditions in other Chesapeake Bay tributaries are somewhat similar to those in the same latitudes along the coast. Ice is not much of a problem in the southerly tributaries. The upper part of Potomac River is closed during severe winters, and Patuxent River is closed nearly to the mouth. Severn River, strangely enough, is said to remain open except for short periods in severe winters. Susquehanna River, at the head of the bay, usually is completely closed for about three months. Ice conditions in the Eastern Shore tributaries correspond roughly to those across the bay.

**ROUTES.**—Deep-draft vessels should stay outside the lightships between New York Harbor and Delaware Bay, and outside Delaware Lightship, Jack Spot Lighted Whistle Buoy 2JS (38°05.3' N., 74°45.1' W.), and Chesapeake Light between Delaware Bay and Chesapeake Bay. Traffic is heavy along this coast and a sharp lookout must be kept to avoid collision.

**Pilotage.**—Pilot boats are stationed in the entrances to Delaware Bay and Chesapeake Bay. See chapters 6, 9, and 15 for additional comment.

**Towage.**—Tugboats operate out of Philadelphia, Norfolk, and Baltimore and can be ordered to other ports. Arrangements for towage should be made by radio.

**Supplies.**—All kinds of supplies are available at the

three big ports. Gasoline, diesel fuel, fresh water, ice, groceries, and some marine hardware are available at the smaller ports.

**Repairs.**—Hulls and machinery of medium to large vessels can be repaired at Chester, Camden, Norfolk, Newport News, and Baltimore. Small vessels can be hauled out and repaired at many other places. Wrecking and salvage equipment is available at Philadelphia, Norfolk, and Baltimore.

**Small-craft facilities.**—There are numerous places where fuel, supplies, repairs, slips for dockage, and launching ramps are available for small craft. In this text "fuel" includes gasoline and diesel, and "supplies" include water, ice, provisions, and marine hardware. For the various towns and isolated places the Coast Pilot includes generalized information about marine facilities; details are given in the series of small-craft charts published for many areas.

**Standard time.**—The region covered by this Coast Pilot uses eastern standard time, which is 5 hours slow of Greenwich mean time. Example: When it is 10 a.m. at Greenwich it is 5 a.m. at Philadelphia.

**Daylight saving time.**—The clocks are advanced 1 hour

on the last Sunday in April and are set back to standard time on the last Sunday in October in New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, and tidewater Virginia.

**LEGAL HOLIDAYS.**—In the areas covered by this Coast Pilot, the following holidays are observed throughout:

January 1, New Year's Day; February 22, Washington's Birthday; May 30, Memorial (Decoration) Day; July 4, Independence Day; Labor Day; November 11, Veterans Day; Thanksgiving Day; December 25, Christmas Day.

Other holidays are observed as indicated: January 19, Lee-Jackson Day in Virginia; January 20, Presidential Inauguration Day, every fourth year, in the District of Columbia; February 12, Lincoln's Birthday, in all except Virginia; Good Friday, in Delaware, New Jersey, Pennsylvania, and Maryland; March 25, Maryland Day in that state; April 13, Thomas Jefferson's Birthday in Virginia; June 14, Flag Day in Pennsylvania; September 12, Defender's Day in Maryland; October 12, Columbus Day, in all except Virginia and the District of Columbia; General Election Day, first Tuesday after the first Monday in November, except in the District of Columbia.

## 4. NEW JERSEY COAST

**Charts 1215 to 1219.**—The coast of New Jersey extends in a general southerly direction for 44 miles from Sandy Hook to Barnegat Inlet, then southwesterly for 66 miles to Cape May Point. From Sandy Hook to Atlantic City the 60-foot curve is 5 to 10 miles from shore; off Delaware Bay the distance has increased to 17 miles.

Deep-draft vessels should stand off the coast in depths of 60 feet or more between New York Bay and Delaware Bay. Light-draft vessels can follow the shore more closely if they pay strict attention to the charts for fishweir areas, shoals, wrecks, and other obstructions. Small craft should wait for favorable weather before attempting an outside run along this coast.

The principal shallow-draft entrances are Shark River Inlet, Manasquan Inlet, Barnegat Inlet, Absecon Inlet, and Cape May Inlet. There are several others that are unimproved. The inlets are, or may be, obstructed by shifting bars, and most require local knowledge to carry the best water. The best time to enter is on a rising tide with a smooth sea; passage is hazardous during easterly gales and heavy seas.

The greater part of the New Jersey coast is summer-resort area, and the numerous standpipes and elevated tanks are prominent from seaward. The New Jersey Intracoastal Waterway, an inside passage from Manasquan Inlet to Delaware Bay, is described in chapter 5.

**Chart 1215.**—Low Sandy Hook, on the south side of the entrance to New York Bay, is the most northerly part of the New Jersey coast. Sandy Hook Light ( $40^{\circ}27.7' \text{ N.}$ ,  $74^{\circ}00.1' \text{ W.}$ ), 88 feet above the water, is shown from an 85-foot stone tower a mile from the north end of the point. The light, established in 1764, is the oldest in continuous use in the United States.

A Coast Guard station, a standpipe, several towers, and two marine lights are prominent on the northern part of the hook. See appendix for New York City and Newark climatological tables and storm warning displays.

Sandy Hook is a Government reservation, and landing is prohibited as far south, approximately, as the bridge over the mouth of Shrewsbury River. Vessels awaiting favorable weather for an outside run can anchor in Sandy Hook Bay south of a line bearing due west from Sandy Hook Light.

Sandy Hook Bay, Navesink River, and Shrewsbury River are described in United States Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

The Highlands of Navesink, on the northwest side of approach to Navesink River, are the highest ground along the open Atlantic Coast between Maine and Florida. The

276-foot wooded ridge is 4 miles south of Sandy Hook Light and 0.5 mile back of the outer beach. Abandoned Navesink Lighthouse is in a cleared space on the easternmost spur at a ground elevation of 180 feet; the two 73-foot brownstone towers, the north one octagonal and the south square, are connected by a dwelling. A privately maintained light, 246 feet above the water, is now shown seasonally from the north tower.

Shrewsbury Rocks, 7.3 miles south of Sandy Hook Light, are 0.4 to a mile offshore and have a least depth of 14 feet; buoys are eastward of the rocks.

**Chart 795.**—Shark River, which enters the Atlantic Ocean 17 miles south of Sandy Hook Light, is the only small-craft harbor between Sandy Hook and Manasquan Inlet. The town of Avon fronts the ocean on the north side of the river and Belmar is on the south side.

Shark River Inlet is protected by jetties, each marked by a light near its outer end. A Coast Guard station is near the beach 0.5 mile north of the inlet; see appendix for storm warning displays.

In December 1965, the controlling depths into Shark River were  $8\frac{1}{2}$  feet through the entrance, thence  $4\frac{1}{2}$  feet to the highway bridge, and thence 8 feet to the Belmar Municipal Boat Basin, 1.2 miles above the jetties. New Jersey maintains and marks several small channels through the flats north and west of the boat basin; controlling depths are about 5 feet.

The mean range of tide is 4.0 feet in Shark River Inlet. In stormy weather breakers form along the bar off the inlet but entrance can be made in moderately rough weather with some local knowledge. A cross-current, strongest on the ebb, may be encountered at Ocean Avenue Bridge at the inner end of the jetties. Vessels for which the closed bridge clearance is insufficient should not attempt entrance until the drawspan is completely open.

Ocean Avenue Bridge has a bascule span with a clearance of 15 feet. The south channel is crossed by three bascule drawbridges 0.7 mile above the entrance; minimum clearance is 10 feet at the upper highway span. Fixed spans with least openings 20 feet wide and 8 feet high are over the upper reach of the north channel. See 203.215, chapter 2, for drawspan regulations.

Complete fuel, supply, repair, and berthing facilities are available for pleasure craft and fishing boats inside the inlet. Most of the facilities are on both sides of the inner bridges. Maximum haul-out capacities are: rail-way, 46 feet; lift, 12 tons.

**Chart 1216.—Sea Girt Light** ( $40^{\circ}08.2'$  N.,  $74^{\circ}01.6'$  W.), 60 feet above the water, is shown from a skeleton tower on the beach 20 miles southward of Sandy Hook Light. The danger zone of a military firing range extends 3 miles seaward from the beach at Sea Girt; see **204.20**, chapter 2, for limits and regulations.

**Chart 795.—Manasquan Inlet**, 22 miles southward of Sandy Hook Light, is the northern terminus of the New Jersey Intracoastal Waterway which is described in chapter 5. A Coast Guard station is on the south side of the inlet, and the jettied entrance is well marked. In 1964, the controlling depths were 10 feet through the jetties, thence 9 feet to the railroad bridge.

**Chart 1216.—Bay Head**, 2 miles south of Manasquan Inlet, is marked by a prominent elevated water tank. From Bay Head south, the resorts are more widely spaced on the low, narrow barrier beach which separates the inside waters from the ocean.

In 1965 an experimental seaweed area 2.5 miles north of Barnegat Inlet was established for about 2 years; special buoys mark the area, and vessels are warned to keep well clear to avoid entangling in the lines.

**Barnegat Inlet**, 21 miles southward of Manasquan Inlet, is protected by two partly submerged jetties, each marked by a light at its outer end. A fog signal is at the south jetty light and a marker radiobeacon is at the Coast Guard station inshore of the south jetty. Abandoned Barnegat Lighthouse, the most prominent landmark in the area, is a 161-foot red-brick tower on the south side of the inlet; the tower is no longer lighted but is maintained by the State of New Jersey as a historical monument.

**Barnegat Lightship** ( $39^{\circ}45.8'$  N.,  $73^{\circ}56.0'$  W.), with red hull and the name BARNEGAT in large white letters on the sides, is moored about 7 miles eastward of the Barnegat Inlet jetties; the light is 65 feet above the water. The vessel has a fog signal and a radiobeacon. The code flag signal and radio call is NNBB. Daytime storm warning displays are made.

Controlling depth into Barnegat Inlet and through Oyster Creek Channel to the New Jersey Intracoastal Waterway is about  $5\frac{1}{2}$  feet. Depths of  $5\frac{1}{2}$  feet or more can be taken to the small-craft and fishing boat facilities on the west side of **Barnegat Light**, a resort on the south side of the inlet.

The buoys marking Barnegat Inlet are shifted in position to mark the channel. Any vessel not familiar with the inlet should lay outside and request assistance from the local Coast Guard station. Strangers should not enter in bad weather.

The mean range of tide is 3.1 feet in Barnegat Inlet and 0.6 feet in Oyster Creek Channel. The current velocity is about 2.5 feet in the inlet.

Fuel, some supplies, and berthing for small craft are available in the Barnegat Light basins. Repairs can be

made; maximum haul-out capacities are: railway, 42 feet; lift, 10 tons.

**Beach Haven Inlet**, 17 miles south-southwestward of Barnegat Inlet, is marked by buoys which are shifted in position to mark the best water. In certain conditions of tide and wind the buoys are drawn under and may not be visible. The controlling depth through the inlet is about 6 feet; mean range of tide is 3.7 feet.

The entrance to Beach Haven Inlet should not be mistaken for Little Egg Inlet which is close southward. Bonds Coast Guard Station is inside the barrier beach 3.2 miles north of Beach Haven Inlet; see appendix for storm warning displays.

**Chart 1217.—Little Egg Inlet**, 19 miles south-southwestward of Barnegat Inlet, is used considerably by local pleasure and fishing boats. Depth over the bar is ample for any vessel that can navigate the inside waters, but in very heavy weather breakers form all the way across the bar. The inlet channels and shoreline are constantly changing; the entrance is well marked but the buoys are not charted because they are frequently shifted in position.

**Brigantine Inlet**, 22 miles south-southwestward of Barnegat Inlet, has shoaled to such an extent that it is unsafe for even the shallowest drafts. **Brigantine Shoal**, 3 miles south of the inlet, has a least depth of 17 feet and is marked by a buoy.

**Absecon Inlet**, 28 miles southwest by south of Barnegat Inlet, is on the northeast side of **Atlantic City**, the largest resort on the New Jersey coast. Abandoned **Absecon Lighthouse** is a 170-foot conical brick tower on the southwest side of the inlet; the lower 100 feet of the tower is painted white, and the upper 70 feet is divided into three horizontal bands of blue, white, and blue.

**Atlantic City Light** ( $39^{\circ}21.9'$  N.,  $74^{\circ}24.7'$  W.), 70 feet above the water, is shown from a white skeleton tower on the south side of Absecon Inlet. A marker radiobeacon is on the inshore end of the south jetty.

Controlling depths in buoyed Absecon Inlet are about 20 feet in the entrance and 12 feet into **Clam Creek**, a mile inside. The mean range of tide is 4.1 feet on the ocean side and about 3.5 feet inside. Current velocities are strong in the channel. Jetties extend from both sides of the entrance and a revetment is on the Atlantic City side. See appendix for storm warning displays and **Atlantic City climatological table**.

**Atlantic City**, on the south side of Absecon Inlet, is a base for a large fleet of fishing vessels and pleasure craft. The city has highway, rail, and air connections with the mainland; highways lead to the coastal towns northward and southward.

**Starns Dock**, 0.9 mile inside Absecon Inlet on the Atlantic City side, has fuel and marine hardware. A Coast Guard station is on the north side of the entrance to Clam Creek.

Most of the marine facilities are inside the Clam Creek basin which includes **Gardner Basin**, **Snug Harbor**, and **Delta Basin**. Gardner Basin has an entrance depth of about 5 feet, while Snug Harbor has 6 feet, and Delta Basin 10 feet. The municipal dock is on the north side of the entrance to Gardner Basin.

Complete supply, fuel, repair, and berthing facilities are available; maximum haul-out capacities are: railway 110 feet; lift, 25 tons.

The highway bridge 1.5 miles above the Absecon Inlet entrance has a bascule span with a clearance of 11 feet. Care must be exercised when passing through this bridge because of the strong currents; velocities of 2.5 knots have been reported.

**Great Egg Harbor Inlet**, 7 miles southwest of Absecon Inlet, has a controlling depth of about 6 feet over the bar. The buoys marking the inlet are not charted because they are shifted frequently to mark the best water. The inlet is used by many local fishing and pleasure boats with drafts up to 5 feet. Breakers extend along the bar even in moderate weather and are hazardous to small boats. The mean range of tide is 3.8 feet in the inlet. The bridges just inside Great Egg Harbor Inlet are described in chapter 5 in connection with the New Jersey Intracoastal Waterway.

**Ocean City**, a large summer resort on the southwest side of Great Egg Harbor Inlet, has rail and highway connections with the mainland. Supplies and facilities are described in connection with the New Jersey Intracoastal Waterway. A Coast Guard station is in a basin on the inner side of the city; see appendix for storm warning displays.

**Corson Inlet**, 14 miles southwest of Absecon Inlet, is subject to constant change in depth and should not be used.

**Ludlam Beach Light** ( $39^{\circ}09.7'$  N.,  $74^{\circ}41.0'$  W.), 45 feet above the water, is shown from a 35-foot red skeleton tower near the northeast end of **Sea Isle City**, 17.5 miles southwestward of Atlantic City Light. A shoal, covered 16 feet and marked by a buoy, is 3 miles southeast of the light. **Avalon Shoal**, covered 26 feet and marked by a lighted buoy, is 7 miles southeast of the light.

**Townsend Inlet**, 20 miles southwest of Absecon Inlet, is subject to wide changes in position and depth, and is used only by small fishing boats. Channel buoys are not charted because they are shifted frequently to mark the best water. The mean range of tide is 3.8 feet in the inlet. The depth over the bar is about 4 feet.

**Townsend Inlet** is a small resort on the northeast side of the inlet. A Coast Guard station is on the northeast side of the resort; see appendix for storm warning displays.

The highway bridge over Townsend Inlet has a bascule span with a clearance of 23 feet. The route of the New Jersey Intracoastal Waterway is just west of the bridge.

**Hereford Inlet**, 28 miles southwest of Absecon Inlet, is subject to rapid change, and although the uncharted buoys are shifted frequently they cannot be relied upon to mark the best water. Breakers form at all times on

the shoals and in moderate weather on the bar. The approach to the inlet is extremely dangerous with a following sea. The mean range of tide is 4.1 feet in Hereford Inlet. The depth over the bar is about 4 feet, but passage should not be attempted without local knowledge.

**Hereford Inlet Light** ( $39^{\circ}00.4'$  N.,  $74^{\circ}47.5'$  W.), 70 feet above the water, is shown from a white skeleton tower on the south side of the inlet in front of the abandoned lighthouse and the former Coast Guard station.

**Nummy Island** is on the inner side of Hereford Inlet; the Intracoastal Waterway passes west of the island. The highway that crosses Nummy Island has drawbridges over **Great Channel**, which leads northward from the inlet, and **Grassy Sound Channel**, which leads westward; both bascule spans have a clearance of 15 feet. See 203.225, chapter 2, for regulations governing the Great Channel drawspan.

Supplies and facilities at Stone Harbor and Wildwood are described with the New Jersey Intracoastal Waterway, chapter 5.

**Chart 234.—Cape May Inlet**, 34 miles southwest of Absecon Inlet, is protected by jetties whose lights are inshore of the submerged ends. A buoy is off the end of the west jetty. A fog signal is at the west jetty light and a marker radiobeacon is at the inshore end. A **327° lighted range** marks the channel between the jetties. Buoys mark the channel inside the harbor. At night the lights on the towers on the east side of the inlet are visible from well offshore.

The danger area of a Coast Guard rifle range extends from **Sewell Point** westward from Cape May Inlet; see 204.23, chapter 2, for limits and regulations.

**Cape May Harbor** is used by fishing fleets, pleasure craft, and the Coast Guard. The fishing vessels operate from wharves below and above the bridge at the northeast end of the harbor and from wharves in **Schellenger Creek**, at the west end of the harbor. Pleasure craft facilities are on the north and west sides of the harbor. Coast Guard facilities are on the south side of the harbor.

The resort town of **Cape May** fronts the ocean 2 miles west of Cape May Inlet. A public Health Service outpatient office is here.

Controlling depths are about 22 feet in Cape May Inlet, thence 15 feet to the Coast Guard large wharf on the south side of the harbor, thence 13 feet to Schellenger Creek, and thence 12 to 7 feet through the creek and northward in a 10-foot channel that connects with the Cape May Canal. Traffic through Schellenger Creek is restricted by the 38-foot wide bascule span of the highway bridge with a clearance of 5 feet that remains in the closed position; see 203.225, chapter 2. The controlling depth is about 13 feet to the fish wharves above the bridge at the northeast end of the harbor.

The mean range of tide is 4.4 feet in Cape May Harbor. The current velocity is about 2 knots in Cape May Inlet. See appendix for **storm warning displays**.

Complete fuel, supply, repair, and berthing facilities are available for fishing and pleasure craft in the harbor. Maximum haul-out capacities are: railway, 80 feet; lift, 25 tons.

The Coast Guard piers on the inner side of Sewell Point are the largest in the harbor and have depths of 15 to 10 feet alongside.

5 The waterway to **Jarvis Sound**, at the northeast end of Cape May Harbor, and through Cape May Canal at the west end, is described with the New Jersey Intracoastal Waterway, chapter 5.

## 5. NEW JERSEY INTRACOASTAL WATERWAY

**Charts 824-SC, 826-SC.**—The New Jersey Intracoastal Waterway is an inside passage that extends 102 miles through bays, lagoons, thorofares, and land cuts from the Atlantic Ocean at Manasquan Inlet to Delaware Bay at a point 2 miles north of Cape May Light.

**Note.**—**Mileages** in the following text are distances along the waterway from the outer ends of the Manasquan Inlet jetties, which are 40 miles by outside run from the Battery, New York.

**Channels.**—The Corps of Engineers project for the waterway provides for a channel 12 feet deep and generally 100 feet wide from Manasquan Inlet to Delaware Bay. Effort is made to maintain a **6-foot controlling depth** for the waterway, but due to continuous shoaling 3 feet or less may be found in places, particularly inside the ocean inlets.

**Aids to navigation.**—The U.S. Coast Guard maintains the standard aids that mark the inlets and the special aids that mark the Intracoastal Waterway; see CG Light List or C&GS Chart 1 for illustrations of special aids.

The Department of Conservation and Economic Development, State of New Jersey, maintains the aids to navigation on the rivers and creeks that empty into the New Jersey Intracoastal Waterway.

**Clearances.**—The least overhead clearance is 35 feet at the fixed bridges at Mile 58.9, Mile 71.8, and Mile 79.4. The fixed bridge with a 25-foot clearance at Mile 65.4 can be bypassed through Risley Channel and Broad Thorofare. The overhead cables have a clearance of 55 feet or more. The minimum width for the waterway is 40 feet at the swing span bridge over Cape May Canal at Mile 100.1. See 203.220, chapter 2, for operating regulations of the waterway drawspans.

**Tides.**—In the inland waters, the tides are greatly affected by the winds both in time and height, westerly winds producing low water and easterly winds high water. In Barnegat Bay, northerly and southerly winds drive the water to the ends of the bay. While the normal range of tide is only about 0.5 foot in sections of the waterway removed from the inlets, strong winds of long duration may cause variations in level of as much as 3 feet below mean low water or 3 feet above mean high water. Near the inlets the wind has less effect and the normal range of tide is 3 to 4 feet.

**Currents.**—Current velocities may reach 3 knots in the inlets and in the narrow channels that connect the inlets with the inside waters.

**Ice.**—The inside waters are completely closed to navigation by ice during extreme winters. In ordinary winters some of the channels, especially near the inlets where the

currents are strong, remain open most of the time, though ice always forms on the flats. The inlets themselves are rarely closed but passage is often difficult because of running ice. All the principal inlets and adjacent channels are used in winter by local fishing boats, but through navigation is usually blocked.

**Facilities.**—At communities along or adjacent to the waterway are numerous piers, wharves, and docks, many of which are open to general public use. Fuel, water, and other supplies are readily available. Public and privately-owned boat basins are located in many streams entering the bays and thorofares through which the waterway passes. Boat-repair and storage yards with marine railways are also scattered along the waterway. Facilities for icing, storing, and shipping seafood are available at most of the larger communities.

**Chart 824-SC** (see also chart 795).—**Manasquan Inlet**, 22 miles southward of Sandy Hook Light, is the northern terminus of the New Jersey Intracoastal Waterway, and is used by many commercial fishing craft and pleasure boats.

The inlet is protected by stone jetties, each marked by a light near the outer ends; give the jetties a good berth to avoid any loose rocks. A fog signal and marker radiobeacon are on the inshore end of the south jetty. A Coast Guard station is on the south side of the inlet; see appendix for storm warning displays.

**Manasquan River**, flowing into Manasquan Inlet from westward, is shallow, but a marked dredged channel through it extends 5 miles above the inlet jetties. Controlling depths are about 8 feet through the inlet to the second bridge, thence 6 feet to the end of the dredged cut.

The mean range of tide is 4 feet in Manasquan Inlet and 3.5 feet at the railroad bridge (Mile 0.9). The current velocity is about 1.8 knots in the inlet.

The resort towns of **Manasquan** and **Point Pleasant Beach** are on the north and south sides of Manasquan Inlet, respectively, while the towns of **Brielle** (Mile 1.1), **Point Pleasant** (Mile 2.0), and **Riviera Beach** (3.5 miles above the inlet jetties) are on Manasquan River.

**Cooks Creek**, Mile 0.4, is an outlet for **Lake Louise** on the south side of Manasquan River. The fixed highway bridge over the creek has a 28-foot channel span with a clearance of 8 feet. Depths are about 6 feet below the bridge decreasing to 2 feet above it.

**Crabtown Creek**, Mile 0.8, enters Manasquan River on the north side. The staked channel has a controlling depth of about 5 feet for 0.7 mile into the northwest fork.

The highway bridge over the creek has a 30-foot bascule span with a clearance of 9 feet.

The railroad bridge at Mile 0.9 has a 48-foot bascule span over Manasquan River with a clearance of 3 feet. Mile 1.1 highway bridge has a bascule span with a clearance of 30 feet; the overhead power cable on the west side has a clearance of 107 feet. The current velocity is about 2.2 knots at the highway bridge.

The highway bridge over Manasquan River at Riviera Beach has a bascule span with a clearance of 15 feet.

Some facilities are along Cooks Creek, Crabtown Creek and tributaries, and up Manasquan River near Point Pleasant and Riviera Beach, but most marine activities are near the two bridges a mile inside Manasquan Inlet. The commercial fishing wharves are along **Wells Hole Thoroughfare**, westward of Cooks Creek; controlling depth is about 8 feet.

Complete fuel, supply, repair, and berthing facilities are available. Maximum haul-out capacities: railway 60 feet; lift, 25 tons.

From Manasquan Inlet, the New Jersey Intracoastal Waterway follows the dredged channel in Manasquan River to Mile 2.3 where it turns south into the **Bay Head-Manasquan Canal**. The 1.6-mile narrow land cut has bulkheaded sides; vessels are required to pass through at a safe speed to avoid damage to structures and boats.

Mile 2.6 highway bridge over the canal has a 47-foot bascule span with a clearance of 10 feet; the overhead power cable has a clearance of 72 feet. The current velocity is about 1.9 feet at the bridge.

There is a small-boat basin on the west side of the canal at Mile 2.9. Gasoline and repairs can be obtained; lift, 10-ton capacity.

Mile 3.4 highway bridge has a swing span with a channel width of 45 feet and a clearance of 14 feet. Just north of the bridge is a small-boat basin and local offices of the New Jersey Bureau of Navigation; see appendix for **storm warning displays**.

At Mile 3.9 the waterway route leaves the canal and passes through **Barnegat Bay**, which has a north-south length of about 25 miles. The western half of the bay has depths of 5 to 10 feet; the eastern half is mostly extensive flats.

Complete fuel, supply, repair, and berthing facilities are available in **Bay Head Harbor** at the north end of Barnegat Bay; maximum haul-out capacities: railway, 80 feet; lift, 30 tons. The mean range of tide is 0.5 foot. See appendix for **storm warning displays**.

**Beaverdam Creek** enters the west side of Barnegat Bay at Mile 4.2. The marked channel into the creek has a controlling depth of about 4 feet. The highway bridge 0.4 mile from the mouth has a swing span with a 40-foot channel width and a clearance of 14 feet; see 203.225, chapter 2, for drawspan regulations. The overhead power cable on the east side of the bridge has a clearance of 62 feet. Gasoline, supplies, and slips are available. Repair facilities are on both sides of the bridge; maximum haul-out capacities: railway, 45 feet; lift, 25 tons.

**Metedeconk River**, separated from Beaverdam Creek by **Wardells Neck**, flows eastward into Barnegat Bay. The northern approach to the river is the same as for Beaverdam Creek; the southern approach is a marked passage between **Herring Island** and **Metedeconk Neck**. The controlling depth into the river is about 4 feet; depths above the entrances are 5 to 8 feet for about 3 miles.

**Laurelton**, 4 miles up Metedeconk River from the Intracoastal Waterway, has facilities for small craft. Under average conditions, boats drawing as much as 3 feet can maneuver the shallow channel to Laurelton; the mean range of tide is almost negligible, and the wind has much more effect than the tide.

Mile 5.5 highway bridge over Barnegat Bay to **Mantoloking** on the barrier beach has a bascule span with a clearance of 14 feet. There are facilities on the west side of the waterway on both sides of the bridge. Fuel, supplies, repairs, and slips are available; maximum haul-out capacities: railway, 65 feet; lift, 50 tons.

**Kettle Creek** flows southeastward into Barnegat Bay opposite Mile 8.7. The creek has depths of 4 feet to the forks 1.4 miles above the mouth. Gasoline and some supplies are available. A boatyard on the south side of the creek has a 5-ton lift that can haul out boats up to 42 feet in length for repairs.

**Shelter Cove**, on the west side of Barnegat Bay at the entrance to **Goose Creek**, opposite Mile 10.7, has gasoline, some supplies, and slips. Repairs can be made; lift, 5 tons. The controlling depth into the cove is about 5 feet.

A marked 6-foot channel follows the inner barrier beach from **Lavallette**, east of Mile 10.0, to **Seaside Heights**, east of Mile 12.8. The 31-foot wide fixed bridge to **West Point Island** has a clearance of 10 feet, but can be bypassed through the channel west of the island.

There are many facilities along the inner barrier beach from Mile 7.6 to Mile 14.5. Fuel, supplies, repairs, and slips are available; maximum haul-out capacities: railway, 65 feet; lift, 19 tons.

Mile 12.3 highway bridge over Barnegat Bay has a bascule span with a clearance of 30 feet. The fixed span of this bridge between **Pelican Island** and **Seaside Heights** has a clearance of 15 feet.

The municipal dock 0.2 mile south of the bridge on the inner side of Seaside Heights has depths of about 7 feet at the face.

**Toms River**, which empties into the west side of Barnegat Bay at Mile 12.7, has midchannel depths of 5 to 7 feet. The mean range of tide is 0.6 foot in the river. The channel is well marked.

**Island Heights**, on the high wooded point on the north side of Toms River 1.7 miles above Barnegat Bay, has a public pier with about 5 feet alongside. Fuel, supplies, and slips are available at several facilities. Repairs can be made; largest haul-out capacities: railway, 50 feet; lift, 25 tons.

The town of **Toms River**, 4 miles upriver from Barnegat Bay, is the head of navigation; controlling

depth to the town is about 5 feet. The town bulkheads provide public berthage. There are complete fuel, supply, repair, and slip facilities; maximum haul-out capacities: railway, 60 feet; lift, 18 tons.

Gasoline, some hardware, and slips are available at a marina on **Goodluck Point** at Mile 14.0. Repairs can be made; lift, 5 tons.

**Cedar Creek**, which empties into the west side of Barnegat Bay at Mile 17.2, has depths of 3 to 4 feet. There is a light on the south side of the entrance, and the interior channel is marked by daybeacons. Small-craft facilities along the 1.4-mile navigable length of Cedar Creek have gasoline, supplies, and slips; repairs can be made; largest lift, 15 tons. See appendix for storm warning displays.

A **211°30'—031°30'** measured statute mile course, maintained by the State of New Jersey, is on the west side of Barnegat Bay at Mile 19.0. The front markers are black piles with square white signs; the rear markers are on shore.

**Forked River**, on the west side of Barnegat Bay opposite Mile 20.4, has a controlling depth of about 5 feet to the head of navigation at the town of **Forked River**, 1.7 miles above the bay. The river forks into three branches about halfway up; the town is on the north side of **North Branch**.

There are several marinas and boatyards on North Branch. Fuel, supplies, slips, and repairs are available; maximum haul-out capacities: railway, 60 feet; lift, 10 tons.

**Oyster Creek**, on the west side of Barnegat Bay opposite Mile 21.5, has a navigable length of about a mile. The entrance is marked by a light and the  $3\frac{1}{2}$ -foot channel by buoys. Gasoline, supplies, and slips are available at the small-craft facilities along the creek. Repairs can be made; largest haul-out capacities: railway, 72 feet; lift, 12 tons.

At Mile 22.6, **Oyster Creek Channel** leads eastward to Barnegat Inlet. The channel and the inlet were described in chapter 4.

There are many small-craft facilities at **Waretown**, west of Mile 22.9 on the bay shore. **Waretown Creek**, north of Waretown, is a sheltered basin with a controlling depth of about 4 feet. The boat basin on the south side of Waretown has a controlling depth of about 5 feet. Fuel, supplies, and slips are available. Repairs can be made; largest lift, 16 tons.

**Double Creek**, southwest of Mile 24.5, is protected on the north side of its entrance by a jetty which has a light on its outer end. The creek has channel depths of 4 feet to the fixed highway bridge 0.7 mile above Barnegat Bay. Gasoline, some supplies, and slips are available at some of the small-boat facilities.

A fixed highway bridge at Mile 32.4 crosses the intra-coastal route through **Manahawkin Bay** and also crosses the marshy islands on the eastern side of the bay. The main channel span, 0.5 mile from the northwestern shore, has a clearance of 60 feet. The span over the channel

between the islands and the barrier beach has a clearance of 15 feet.

There are many small-boat facilities along the bay shore of **Long Beach** between Barnegat Inlet and Beach Haven Inlet. Most of these are near the bridge, Mile 32.4; at **Ship Bottom**, Mile 34.0, and at **Beach Haven**, Mile 39.0. Fuel, supplies, and slips are available. Repairs can be made; largest haul-out capacities: railway, 40 feet; lift, 25 tons.

**Westecunk Creek**, 2 miles northwest of Mile 37.0, has depths of 4 feet to the public landing 2.5 miles above the mouth; the town of **West Creek** is 0.3 mile west of the landing. A marine railway on the southwest side of the creek entrance can haul out vessels up to 35 feet in length.

Gasoline and some supplies can be obtained.

**Chart 826-SC.**—**Little Egg Harbor** has general depths of 4 to 6 feet in its northwestern part; in the southern part is a large group of marshy islands surrounded by a shallow area with depths of 1 to 3 feet. Daybeacons mark a race course in the harbor. Between some of these islands are narrow unmarked channels which begin and end abruptly in the shallow areas. The Intracoastal Waterway continues southward along the inner side of the barrier beach.

**Parker Cove** is on the north side of Little Egg Harbor about 3 miles northwest of Mile 38.0. **Parker Run**, which empties into the northwest corner of the cove, has depths of about 4 feet to a public dock on the north side 0.3 mile above the entrance. Berthage is available at the dock, and gasoline can be obtained.

**Tuckerton Creek** empties into the west side of Little Egg Harbor about 4 miles northwest of Mile 42.0. A dredged approach, marked by lights, extends 1.6 miles southeastward from the mouth of the creek to the north end of **Story Island Channel**. The approach channel has a controlling depth of about 6 feet to **Parkers Landing**, 0.9 mile above the mouth, thence 5 feet to **Scow Landing**, 1.6 miles above the mouth, and thence 3 feet to the milldam at **Tuckerton**, 1.8 miles above the mouth. An overhead power cable, 0.6 mile above the mouth, has a clearance of 50 feet.

The mean range of tide is 2.4 feet throughout the Tuckerton Creek channel. Cross currents may be experienced in the approach channel. A speed limit of 8 miles per hour is prescribed for the channel; see **207.70**, chapter 2.

Supplies and gasoline are available along Tuckerton Creek. Vessels up to 58 feet in length can be hauled out for repairs.

At Mile 42.5, **Marshelder Channel**, with depths of 7 feet or more, makes northward and around the southwest side of **Story Island** for 2.5 miles to Little Egg Harbor and the dredged approach to Tuckerton Creek.

There are several thorofares through the marsh area south and west of Marshelder Channel, but **Little Sheepshead Creek** is the only one of any importance. This 2-mile winding passage from Mile 43.3 of the Intracoastal Waterway to the eastern side of Great Bay has a controlling depth of about 3 feet and is used extensively.

The fixed highway bridge over Little Sheepshead Creek has an 18-foot channel span with a clearance of 14 feet; overhead power cables have a least clearance of 36 feet.

The waterway route skirts the inner ends of the shoals in **Beach Haven Inlet** and **Little Egg Inlet**, both mentioned in chapter 4, and continues westward through **Shooting Thorofare** and along the south side of **Great Bay**, which has general depths of 4 to 7 feet.

**Big Creek**, entering **Great Bay** on the north side, has depths of about 5 feet to a large marina 2 miles above the mouth. A highway bridge with a 30-foot fixed span and clearance of 12 feet crosses the creek 1.2 miles above the mouth. Gasoline, some supplies, and slips are available. Minor repairs can be made; lift, 15 tons.

**Mullica River**, which empties into the northwestern part of **Great Bay**, is navigable to a milldam 20 miles above the bay. A depth of about 4 feet can be carried across the **Great Bay flats** to the mouth of the river. Once inside the river, the water is deep and the midchannel is clear for a long distance.

Depths of 8 to 4 feet can be carried from the mouth of **Mullica River** to the bridge 16 miles above the entrance, and thence  $2\frac{1}{2}$  feet to within a mile of the milldam. A lighted cutoff 3 miles above the mouth has ample depth and reduces distances to points on the upper river by about 2 miles.

The navigation of **Mullica River** is fairly easy in the lower reaches, but the chart should be followed closely to avoid the unmarked 3-foot shoals in the entrance. The last few miles to the milldam are shallow, difficult, and full of stumps. The river is marked by lights and stake daybeacons as far as the first bridge; stake daybeacons mark the reaches above the bridge.

The fixed highway bridge 6.5 miles above the mouth of **Mullica River** has a clearance of 30 feet; the overhead power cable 500 feet above the bridge has a clearance of 67 feet. A boatyard 0.5 mile below the bridge has a 10-ton lift; minor repairs can be made and gasoline is available. The highway bridge 13 miles above the mouth has a 30-foot bascule span with a clearance of 6 feet. The highway bridge 16 miles above the mouth has a 30-foot bascule span with a clearance of 5 feet. Gasoline, some supplies, and slips are available at small-craft facilities at **Green Bank** and **Sweetwater**, about 16 and 17 miles above the mouth, respectively. Minor repairs can be made; largest lift, 3 tons.

**Nacote Creek** empties into the southwest side of **Mullica River** 4 miles above the mouth. Controlling depths are about 5 feet to the highway bridge 1.6 miles above the mouth of the creek, and thence 3 feet to **Port Republic**, at the head of navigation 3.6 miles from the mouth. The bridge has a 30-foot bascule span with a clearance of 5 feet; the overhead power cable on the east side of the bridge has a clearance of 57 feet. Repairs can be made at the boatyards near the bridge; largest marine railway, 50 feet. Gasoline is available.

**Bass River**, which empties into the north side of **Mullica River** 5 miles above the mouth, has depths of about 4 feet to **New Gretna**, 2.4 miles above **Mullica River**. The highway bridge at **New Gretna** has a 30-foot bascule span with a clearance of 9 feet; see 203.225, chapter 2, for drawspan regulations. The overhead power cable near the bridge has a clearance of 42 feet. The fixed highway bridge just upstream has a clearance of 20 feet. Small-craft facilities at **New Gretna** have fuel, supplies, and slips. Repairs can be made; largest haul-out capacities: railway, 30 feet; lift, 20 tons.

**Wading River**, which empties into the north side of **Mullica River** 7.5 miles above the mouth, has depths of about 4 feet to the highway bridge 4 miles upstream. The bridge has a 30-foot bascule span with a clearance of 5 feet.

**Mott Creek**, on the west side of **Great Bay**, is marked by a light and has depths of about 4 feet to a bulkhead landing 1.5 miles above the mouth; gasoline and some supplies are available. The 2-mile thorofare that winds northward through the marshes from the **Mott Creek** landing to the mouth of **Nacote Creek** has a controlling depth of about 2 feet.

**Oyster Creek**, on the west side of **Great Bay** 0.7 mile south of **Mott Creek**, is marked by a light and has depths of 4 feet to the small fishing village of **Oyster Creek**, 0.3 mile from the mouth, and 0.2 mile beyond to a public landing where fuel and some other supplies are available.

The Intracoastal Waterway leaves **Great Bay** at Mile 48.9 and follows **Main Marsh Thorofare** to **Little Bay**, and thence along the western side of **Little Bay** across the mouths of **Hammock Cove** and **Perch Cove** and westward of **Shad Island**.

At Mile 51.7, an alternate route swings eastward in **Brigantine Channel**, which leads to **Brigantine Inlet**, mentioned in chapter 4. About 1.3 miles along the channel, the alternate route turns southward and follows **Obes Thorofare** along the inner side of **Brigantine**. The overhead power cable that crosses **Obes Thorofare** 1.3 miles from **Brigantine Channel** has a clearance of 47 feet.

There are many small-craft facilities along the bay side of **Brigantine**; gasoline, supplies, and slips are available. **Baremore Quarters**, a cove on the inner side of **Brigantine** 2.3 miles along **Obes Thorofare** from **Brigantine Channel**, is a good harbor of refuge. Repairs can be made at the boatyards in the cove; largest lift, 8 tons.

From **Baremore Quarters**, the alternate route follows **Bonita Tideway** along the city waterfront, then swings westward through **Golden Hammock Thorofare** and rejoins the main route at Mile 55.0. The total length of the alternate route is 7 miles. Depths of 5 feet or more are on the alternate route along the inner side of **Brigantine**, but the channels shoal as they near the main Intracoastal Waterway route and can be navigated only by shallow drafts.

The main route of the waterway leaves **Little Bay** at Mile 51.7 and continues along the northwestern side of **Grassy Bay**, a shoal area mostly bare at low water, to **Meadow Cut**. From this short land cut the route follows

the southeastern side of **Reed Bay** to and through **Gull Island Thorofare**, across the mouth of **Broad Creek**, through **Middle Thorofare**, where it is rejoined by the alternate route from **Brigantine**, and into **Absecon Channel** at Mile 55.4 which leads to **Absecon Inlet** and the marine facilities in **Clam Creek** at **Atlantic City**; see chapter 4.

**Absecon Channel**, the marked approach to **Absecon Creek** through **Absecon Bay**, can be entered at Mile 55.4 or through **Point Bar Thorofare** at Mile 56.2. **Absecon Bay** is shallow and bares in some places at low water. **Absecon Creek** flows into the northwest side of the bay. The controlling depth is about 2½ feet from **Absecon Inlet** to **Absecon**, 1.5 miles up **Absecon Creek**, except for shoaling to less than a foot in the bay channel. The mean range of tide is 3.6 feet at the mouth of the creek. Small boats can be repaired at boatyards below **Absecon**; largest railway, 35 feet. Gasoline is available.

From **Absecon Channel**, the **Intracoastal Waterway** follows **Beach Thorofare** along the northwest side of **Atlantic City**. The highway bridge over the thorofare at Mile 57.4 has a bascule span with a clearance of 20 feet.

The railroad bridge over **Beach Thorofare** at Mile 58.8 has a swing span with a clearance of 5 feet. The overhead power cables 200 yards north of the bridge have a clearance of 110 feet. A fixed highway bridge 200 feet south of the railroad bridge has a clearance of 35 feet.

The route of the waterway leaves **Beach Thorofare** at Mile 59.3 and continues along the inner side of **Atlantic City** by way of **Inside Thorofare**. **Albany Avenue Bridge**, which crosses **Inside Thorofare** at Mile 59.8, has a bascule span with a clearance of 10 feet. On the southeast side of the bridge is a fuel pier that offers overnight docking; fuel and some supplies are available.

The highway bridge over the waterway at Mile 61.0 connects **Ventnor Heights**, on the northwest side, with **Ventnor City**, on the beach; the bridge has a bascule span with a clearance of 9 feet. Gasoline, supplies, and slips are available. Repairs can be made; maximum haul-out capacities: railway, 45 feet; lift, 6 tons.

The waterway turns sharply northwestward at Mile 61.1 and follows **West Canal** along the southwest side of **Ventnor Heights** to Mile 62.1, where it rejoins **Beach Thorofare** and continues southwestward.

From Mile 63.1 southwest of **Shelter Island**, a marked channel with a controlling depth of about 3 feet leads northward along the eastern shores of **Shelter Island Bay** and **Lakes Bay** to **West Atlantic City**, 2.2 miles from the waterway. The channel continues along the north shore of **Lakes Bay** to the municipal boat basin and adjacent yacht club at **Pleasantville**, 3.4 miles from the waterway. Gasoline and some supplies are available.

The highway bridge over **Beach Thorofare** at Mile 63.7 has a bascule span with a clearance of 14 feet. **Margate City** is on the beach south of the bridge. The **Margate City** basins offer gasoline and some supplies. One of the basins has a crane that can handle boats up to 12 tons for repairs.

At Mile 65.1, **Risley Channel** and **Dock Thorofare** lead northward for 2.2 miles to a marine basin near **Northfield**. Vessels up to 65 feet in length can be hauled out for repairs. Gasoline, slips, and supplies are obtainable.

At Mile 65.2 there is a choice of two routes to the inner side of **Ocean City**. The exposed route west of the **Longport** waterfront and across **Great Egg Harbor Inlet** has deeper water, but is restricted by the 25-foot clearance of the fixed highway bridge at Mile 65.4. Care is necessary when passing through the bridge to avoid the shoal making out into the channel from the west side. Repairs can be made at a boatyard just south of the bridge; lift, 12 tons. Gasoline is available. Currents are strong at the inlet crossing, and the route is exposed to heavy easterly seas. The highway bridge over the inlet at Mile 67.0 has a bascule span with a clearance of 23 feet at the center.

The protected route is through **Risley Channel** and **Broad Thorofare**, but the channel is subject to continuous shoaling. The highway bridge over **Broad Thorofare** has a 49-foot bascule span with a clearance of 9 feet.

**Ship Channel** extends northwestward from the bridge at Mile 67.0 to **Great Egg Harbor Bay**. **Bass Harbor**, a narrow channel leading northward from **Ship Channel** 1.7 miles from the inlet bridge, has depths of about 10 feet in the entrance; the fixed highway bridge 0.3 mile north of the entrance has a 14-foot channel span with a clearance of 6 feet.

**Somers Point**, on the north side of **Ship Channel** 2 miles from the inlet bridge, is a summer resort with wharves that have depths of 2 to 5 feet at their outer ends.

There are many marinas and boatyards in **Bass Harbor** and along **Somers Point**. Gasoline, supplies, and slips are available. Complete repairs can be made; maximum haul-out capacities: railway, 65 feet; lift, 20 tons.

A 2-mile combination of highway bridges and causeways extends southeastward over the channels and islands in **Great Egg Harbor Bay** from **Somers Point** to **Ocean City**. The bascule span over **Ship Channel** has a clearance of 14 feet. The bascule span over the **Intracoastal Waterway** at Mile 68.6, on the inner side of **Ocean City**, also has a clearance of 14 feet.

The fixed highway bridge that crosses **Great Egg Harbor Bay** 1.7 miles west of the bridge at Mile 68.6 has a central-span clearance of 50 feet. An older highway bridge, 0.2 mile to the westward, has a bascule span with a clearance of 14 feet. About 0.5 mile above the old bridge, an overhead power cable with a clearance of 76 feet over the channel and 50 feet outside the channel, crosses near the head of the bay.

**Patcong Creek** empties into the north side of **Great Egg Harbor Bay** 2.1 miles above the bridge at Mile 68.6. The depth over the bar at the entrance is about 3 feet. The highway bridge 0.5 mile from the mouth of the creek has a swing span with a channel width of 34 feet and a clearance of 6 feet; the eastern opening should be used because the channel veers sharply to the eastward and passes close

to the inner side of the first bend. See **203.225**, chapter 2, for drawspan regulations.

The fixed highway bridge 2.3 miles above the entrance to Patcong Creek has a channel span with a clearance of 8 feet. Another fixed highway bridge 3 miles above the entrance has a 30-foot channel span with a clearance of 7 feet; about 100 yards below this bridge, the decomposed piles of a former dam extend westward of midstream and are extremely dangerous. Gasoline, some supplies, and slips are available near the first bridge. Repairs can be made; lift, 10 tons.

**Tuckahoe River** empties into the south side of Great Egg Harbor Bay 2.7 miles westward of the bridge at Mile 68.6. Controlling depths are about 2 feet across the flats at the entrance, thence 3 feet for 7 miles to the town of **Tuckahoe**. The overhead power cable 3 miles above the entrance has a clearance of 100 feet, and the one a mile below Tuckahoe, 41 feet. A highway bridge at the town has a 30-foot bascule span with a clearance of 9 feet; see **203.225**, chapter 2, for drawspan regulations. The power cable at the bridge has a clearance of 40 feet.

Just below the bridge is a yacht club and marina; gasoline and some supplies are obtainable.

**Cedar Swamp Creek** empties into the south side of Tuckahoe River 4.3 miles above the river mouth. The creek has depths of about 4 feet to a highway culvert 2.5 miles from the river where a marine railway can haul out boats up to 25 feet in length for repairs.

**Great Egg Harbor River** is a northwestward continuation of Great Egg Harbor Bay. The controlling depth is about 4 feet from Great Egg Harbor Bay to Mays Landing, at the head of navigation. The overhead power cables between the bay and Mays Landing have clearances of 65 feet or more. The mean range of tide is 4.0 feet at Mays Landing.

**Middle River** empties into the southwest side of Great Egg Harbor River 0.5 mile above the bay. Depths of 4 feet can be carried up Middle River for 2 miles. The overhead power cable a mile above the entrance has a clearance of 50 feet.

**Powell Creek** empties into the east side of Great Egg Harbor River 5 miles above the bay. Depths of about 2½ feet can be taken to small-craft facilities about 0.5 mile above the mouth. Gasoline, some supplies, and slips are available. Some repairs can be made; lift, 18 tons.

Gasoline and slips are available on Great Egg Harbor River about 8 miles above the mouth. Repairs can be made; marine railway, 50 feet.

**Mays Landing**, at the head of navigation on Great Egg Harbor River, is 12 miles from Great Egg Harbor Bay. The river water is nearly fresh at the town. The town bulkhead has depths of about 5 feet alongside. A marina has gasoline, some supplies, and slips. Some repairs can be made; marine railway, 46 feet.

The Intracoastal Waterway continues southerly along the inner side of **Ocean City**; lagoons here accommodate craft drawing up to 5 feet. Fuel, supplies, and slips are

obtainable, and the maximum haul-out capacity is 75 feet in length.

The waterway follows **Beach Thorofare** to **Peck Bay**; the mudflats bordering the channel through the bay are visible in some places at low water. The highway bridge at Mile 71.8 has a fixed channel span with a clearance of 35 feet.

From Peck Bay, the route follows **Crook Horn Creek**. The railroad bridge over the creek at Mile 73.6 has a swing span with a clearance of 2 feet. The west opening should be used as the east one is obstructed. The swing span moves slowly.

The waterway enters **Middle Thorofare** at Mile 74.7, thence continues through **Ben Hands Thorofare** to Mile 76.4 in **Main Channel** which leads eastward and northward for 1.5 miles to the inner side of **Strathmere**, just south of Corson Inlet. The highway bridge over the waterfront channel at Strathmere has a bascule span with a clearance of 15 feet. Gasoline and some supplies are available at Strathmere.

The waterway follows **Main Channel** southwestward, passing into shallow **Ludlam Bay** at Mile 77.5 and enters **Ludlam Thorofare** at Mile 78.8. The fixed highway bridge at Mile 79.2 has a clearance of 35 feet, and the overhead power cable crossing at Mile 79.4 has a clearance of 58 feet.

**Sea Isle City**, on the barrier beach at the southeast end of the bridge at Mile 79.4, has several basins with depths of 3 to 6 feet in the entrances and slightly more inside. Gasoline, supplies, and slips are available. Repairs can be made; largest lift, 20 tons.

The waterway enters **Townsend Channel** at Mile 81.0 and follows the inner side of the resort known as **Townsend Inlet**. Fuel, supplies, and slips are available.

At Mile 82.2, the waterway is 300 yards west of the highway bridge over **Townsend Inlet**, described in chapter 4. **Avalon**, on the southwest side of the inlet, is separated from the waterway's **Ingram Thorofare** by a wide marsh area.

**Cornell Harbor**, a channel with depths of 2 to 3 feet, leads southeastward through the marsh from Mile 82.5 to Avalon and thence along the inner side of the resort.

The highway bridge that crosses Ingram Thorofare to Avalon at Mile 83.0 has a swing span with a 49-foot channel width and a 6-foot clearance.

**Pennsylvania Harbor**, along the north side of the bridge at Mile 83.0, has 2 feet at the entrance with deeper water inside. **Princeton Harbor**, along the south side of the same bridge, has an entrance depth of 6 feet, but as little as 2 feet inside. Both waterways lead to Avalon waterfront. The fixed bridges over the Avalon channel at the inner ends of the two harbors restrict passage between them or to the southwest to an overhead clearance of 4 feet.

Fuel, supplies, and slips are available at Avalon. Repairs can be made; largest lift, 16 tons.

The waterway follows Ingram Thorofare westward to **Paddy Thorofare**, thence into shallow **Great Sound** at Mile 85.0. At Mile 86.1, the route leaves Great Sound and follows **Gull Island Thorofare** southward to the Stone Harbor waterfront.

**Stone Harbor** is a resort on the northeast side of Hereford Inlet. The highway bridge over the waterway at Mile 88.4 has a bascule span with an 11-foot clearance.

There are several basins along the Stone Harbor waterfront where fuel and supplies can be obtained. Slips are available and repairs can be made; largest lift, 20 tons.

The waterway follows **Great Channel** southwestward along the Stone Harbor waterfront, then turns sharply westward at Mile 89.4 and follows the northwestern shore of **Nummy Island**. The bridge over the channel that leads along the east side of Nummy Island to **Hereford Inlet** was described in chapter 4.

At Mile 90.9, the waterway route through **Grassy Sound Channel** is joined by the main channel from Hereford Inlet. The bascule bridge over the inlet channel was described in chapter 4.

**Beach Creek**, on the inner side of North Wildwood just south of Hereford Inlet, has depths of about 2 feet in the entrance, but deeper water inside. The fixed bridge 0.4 mile above the entrance has a channel width of 17 feet and a clearance of 5 feet.

The highway bridge over the waterway at Mile 91.4 has a bascule span with an 8-foot clearance. The route enters **Grassy Sound** at Mile 91.9 and follows a well-marked channel. The railroad bridge over the waterway at Mile 93.2, the southwestern end of Grassy Sound, has a bascule span with a 6-foot clearance; the overhead power cable at the bridge has a 100-foot clearance.

East of the bridge at Mile 93.2, a 5-foot channel leads along the northeast side of West Wildwood for 0.8 mile to the inner waterfront of **Wildwood**. Passage is limited by the 5-foot clearances of the fixed bridges that connect the two communities.

At Mile 94.2, **Post Creek** extends eastward from the waterway and widens into a small bay between Wildwood and West Wildwood. **Ottens Harbor**, a dredged slip with depths of about 10 feet, extends 0.5 mile southeastward from the mouth of Post Creek. Commercial wharves

are along the waterway which can accommodate vessels up to 150 feet in length.

The highway bridge over the waterway at Mile 94.4 has a bascule span with a 25-foot clearance.

**Sunset Lake**, a comparatively deep basin on the inner side of **Wildwood Crest**, can be entered from either Mile 94.8 or Mile 95.4 of the intracoastal route. The controlling depth is about 7 feet in the entrances.

There are many places along the **Wildwood** waterfront for fuel and supplies. Slips are available and repairs can be made; largest marine railway, 50 feet; lift 80 tons.

The waterway continues southward through **Jarvis Sound** and **Middle Thorofare**. The highway bridge over Middle Thorofare at Mile 97.4 has a bascule span with a clearance of 23 feet. Just north of the bridge, **Lower Thorofare** leads eastward from the waterway for 0.3 mile, then turns northward. There is a long marginal fish wharf on the east side of Lower Thorofare; fuel and supplies are available.

The waterway route crosses the inner end of **Cape May Inlet** at Mile 97.7 and continues westward through **Cape May Harbor**; the inlet and the harbor were described in chapter 4.

**Cape May Canal** is entered at Mile 98.9. Vessels transiting the canal should limit their speed to 5 knots and should proceed with special care in the vicinity of the bridges; passage of barge tows may be delayed because of tide and current conditions.

The mean range of tide is between 4 and 5 feet in Cape May Canal. The current velocity is 1.9 knots at the east end and 0.9 knot at the west end. In 1965 the controlling depth was 6 feet.

The fixed highway bridge over Cape May Canal at Mile 99.1 has a clearance of 55 feet. The railroad bridge at Mile 99.9 has a swing span with a clearance of 4 feet. The highway bridge at Mile 100.1 has a swing span with a 40-foot channel width and a 10-foot clearance.

The Cape May terminal of the **Cape May-Lewes Ferry** is on the north side of Cape May Canal at Mile 101.8.

At Mile 102.0, Cape May Canal enters Delaware Bay between stone jetties which are 2 miles north of Cape May Light. The outer ends of the jetties are marked by lights; a fog signal is on the north jetty.

## 6. DELAWARE BAY

**Chart 1219.**—**Delaware Bay** and Delaware River form the boundary between the State of New Jersey on the east and the States of Delaware and Pennsylvania on the west. The bay is only an expansion of the lower part of Delaware River; the arbitrary dividing line, 42 miles above the Delaware Capes, extends from Liston Point, Del., to Hope Creek, N.J. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Cape May on the northeast and Cape Henlopen on the southwest. Medium-draft vessels can enter from Chesapeake Bay on the south by way of the Chesapeake and Delaware Canal, which is described in chapter 7. The bay is the approach to Wilmington, Chester, Marcus Hook, Philadelphia, Camden, Trenton, and many lesser ports.

**Mileages** shown in this chapter, such as Mile 0.9E, Mile 12W, etc., are the nautical miles above the **Delaware Capes** (or, "the Capes"), referring to a line from Cape May Light to the tip of Cape Henlopen. The letters N, S, E, or W, following the numbers, denote by compass points the side of the river where each feature is located.

The approaches to Delaware Bay have few off-lying dangers. An obstruction, unproved as to position and depth, is shown on chart 1109 at 38°40' N., 73°52' W., about 58 miles eastward of Cape Henlopen; the obstruction is said to be only 5 fathoms deep, and the area should be avoided.

The 100-fathom curve is 50 to 75 miles off Delaware Bay, and the 20-fathom curve is about 25 miles off. Depths inside the 20-fathom curve are irregular, and in thick weather a deep-draft vessel should not approach the coast closer than depths of 12 fathoms until sure of its position; the safest approach or passing courses would be outside Five Fathom Bank and/or Delaware Lightships.

**Cape May** is the extensive peninsula on the northeast side of the entrance to Delaware Bay. **Cape May Light** (38°56.0' N., 74°57.6' W.), 165 feet above the water, is shown from a 170-foot white tower on Cape May Point.

The shoals off Cape May are mixed clay and sand and have the consistency of hardpan; the ridges run in approximately the same directions as the currents. **Cape May Channel**, a mile southwest of the cape, is the principal buoyed passage between the shoals; the controlling depth is about 13 feet.

The channels have strong currents, and many tide rips form near **Prissy Wicks Shoal**, which has depths as little as 2 feet about 2 miles south of Cape May Light. In Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb.

**Overfalls Shoal** has a depth of 6 feet about 5 miles southwestward of Cape May Light. The 30-foot curve extends 3 miles farther in the general direction of Cape Henlopen and has a depth of 19 feet at its outermost limit.

**McCrie Shoal**, 7 miles southeast of Cape May Light, has a least charted depth of 18 feet; a lighted buoy is on the east side of the shoal.

**Five Fathom Bank** has a least charted depth of 17 feet about 15 miles eastward of Cape May Light. The area inclosed by the 30-foot curve is about 9 miles long, north to south, and about 2 miles wide. The greater part of Five Fathom Bank is within authorized fishtrap limits. Several buoys are moored around the bank.

**Five Fathom Bank Lightship** (38°47.3' N., 74°34.6' W.), with red hull and the name FIVE FATHOM in large white letters on the sides, is about 20 miles east-southeast of Cape May Light; the light is 65 feet above the water. The vessel has a fog signal and a radio-beacon. The code flag signal and radio call is NNBL. Daytime storm warnings are displayed.

**Cape Henlopen** (see also chart 411), on the southwest side of the entrance to Delaware Bay, is marked by a number of towers and buildings. About 0.5 mile southward from the tip of the cape is a station from which vessels are reported to the Philadelphia Maritime Exchange; see appendix for storm warning displays. **Cape Henlopen Radiobeacon** (38°47.6' N., 75°05.5' W.) is 100 yards northeast of the station.

A naval restricted area extends northeastward from Cape Henlopen to Overfalls Shoal; see 207.105, chapter 2, for limits and regulations.

**Hen and Chickens Shoal** extends southeastward from the tip of Cape Henlopen. The shoal has depths of 5 feet a mile from the tip and 9 feet 2 miles farther to the southeastward. The southern limit of the 30-foot curve is marked by a lighted buoy which is 7 miles from Cape Henlopen and 3.5 miles off Rehoboth Beach.

The Cape May-Lewes Ferry crosses the main channel in Delaware Bay about 4 miles northward of Cape Henlopen.

**Delaware Lightship** (38°27.2' N., 74°35.1' W.), with red hull and the name DELAWARE in large white letters on the sides, is about 32 miles southeastward of Cape Henlopen; the light is 66 feet above the water. The vessel has a fog signal and a radio beacon. The code flag signal and radio call is NNBE. Daytime storm warnings are displayed.

**Boundary lines of inland waters.**—The lines established for Delaware Bay Entrance are described in 82.25, chapter 2.

**Channels.**—Delaware Bay is shallow along its north-eastern and southwestern sides and there are extensive shoal areas close to the main channel. The bay has natural depths of 50 feet or more for a distance of 5 miles above the Capes; thence a Federal project depth of 40 feet to the upper end of Newbold Island, 110 miles above the Capes.

**Anchorage.**—Deep-draft vessels sometimes anchor in various places along the dredged channel through the lower bay but usually continue to more sheltered areas in the upper bay and river. Defined anchorage areas in Delaware Bay and Delaware River are shown on the chart; see **202.157**, chapter 2, for limits and regulations.

In bad weather tows and small craft sometimes anchor behind the breakwaters north and west of Cape Henlopen.

**Tides.**—The mean range of tide is 4.1 feet in Breakwater Harbor, 5.5 feet at Reedy Point, 5.6 feet at Marcus Hook, 5.9 feet at Philadelphia, and 6.8 feet at Trenton. See the Tide Tables for daily predictions for Breakwater Harbor, Reedy Point, and Philadelphia.

**Currents.**—The current velocity is 1.8 knots in Delaware Bay Entrance; see the Tidal Current Tables for daily predictions. The tables also list current differences and other constants for about 55 other places in Delaware Bay and River.

The Tidal Current Charts, Delaware Bay and River, present a comprehensive view of the tidal-current movement in the bay and river, and provide a means of readily determining the direction and velocity of the current at various places throughout the waterway. The charts may be used for any year and are referred to daily predictions for Delaware Bay Entrance.

**Weather.**—Fogs are most frequent along this part of the Atlantic Coast during December, January, and February, but may be encountered at other times. The fogs come in with easterly winds and are cleared away by westerly and northerly winds. In the late fall, dense fogs are liable to occur and may last through the forenoons for two or three days in succession. Autumn fogs nearly always clear away before noon.

**Ice.**—In ordinary winters there is usually sufficient ice in Delaware Bay and River to be of some concern to navigation. Thin ice has been known to form early in December between Chester and Philadelphia, but the heavier ice usually does not begin to run before January. The tidal currents keep the ice in motion, except where it packs in the narrower parts of the river; ice breakers from Philadelphia keep these parts of the river open. The ice usually packs heavier than elsewhere at Ship John Shoal, at Pea Patch Island, at Deepwater Point, and below Gloucester City. Ice is rarely encountered after the early part of March.

In severe winters, navigation has occasionally been interrupted above Chester, but the powerful vessels employed in the foreign and coasting trade keep the channel fairly open. The greatest danger is to wooden vessels, which are liable to be cut through on the waterline if they encounter thin ice.

**Freshets.**—Freshets are of rare occurrence, except in the vicinity of Trenton, and do not interfere with navigation unless accompanied by ice. Freshets and ice above Philadelphia are discussed further in the latter part of this chapter.

See appendix for **Philadelphia climatological table**.

**Pilotage.**—Pilotage on Delaware Bay and Delaware River is provided by the Pilots' Association for the Bay and River Delaware, whose office is in Philadelphia. Pilots for incoming vessels are furnished from the association's pilot boats which cruise off the Delaware Capes.

The pilot boat PHILADELPHIA, painted dark blue with white housing and a blue stack with the letter "P" in its center, usually will be found cruising between the entrance buoy and the Harbor of Refuge. The pilot boat maintains watch on 2182, 2638, and 2738 kcs. The pilots carry portable radiotelephones for bridge-to-bridge communication on 156.65 mc.

Every ship arriving from or bound to a foreign port is obliged to take a pilot. Pilotage is optional for vessels employed in or licensed for the coasting trade if they have on board a pilot licensed by the Federal Government, to operate in these waters.

**Towage.**—A large fleet of tugs, operating out of Philadelphia, is available at any time of the day or night for any type service required. Most of the tugboat companies will dispatch their vessels to any place in Delaware Bay or its tributaries. Some of the companies also have tugs available for deep-sea towing.

**Quarantine.**—All inbound vessels subject to quarantine inspection and destined to points above Marcus Hook are required to anchor off the Marcus Hook boarding station and may not proceed until granted clearance. Detention cases are taken to Philadelphia General Hospital.

**Customs and Immigration.**—The Bureau of Customs and the Immigration and Naturalization Service have district headquarters in Philadelphia.

**Supplies.**—Bunker oil is available in quantity at Philadelphia and at several other places, including Delaware City, on the north side of the entrance to the Chesapeake and Delaware Canal. Many vessels are bunkered from barges alongside. Fresh water is unlimited in the larger ports. Small craft can obtain fuel and supplies not only in the larger ports but at many of the smaller cities and towns along the river and bay.

**Repairs.**—The largest shipyards along Delaware River are at Chester, Pa., and Camden, N.J. Many of the other cities and towns have boatyards for smaller craft.

**Chart 411.**—**Delaware Breakwater** is the popular name for the anchorage areas behind the outer and inner breakwaters north and west of Cape Henlopen. Harbor of Refuge is the outer and deeper of the two areas; Breakwater Harbor is the inner area.

**Harbor of Refuge** is behind the breakwater that begins 0.7 mile north of Cape Henlopen and extends 1.3 miles in a north-northwestward direction. A line of ice breakers, marked by lights at the outer ends, extends 0.4 mile in a

west-by-south direction onto **The Shears** from a position 0.4 mile northwestward of the north end of the breakwater. **Harbor of Refuge Light** ( $38^{\circ}48.9' \text{ N.}$ ,  $75^{\circ}05.6' \text{ W.}$ ), 72 feet above the water, is shown from a white conical tower on a cylindrical substructure near the south end of the breakwater; the station has a fog signal. A low-power light marks the north end of the breakwater.

The harbor has depths of 15 to 70 feet between the breakwater and a shoal ridge, 8 to 12 feet deep, a mile to the southwestward. The deepest water is behind the **Harbor of Refuge Light**. The entrance from southeastward is deep and clear, while that from northwestward across **The Shears** has depths of 10 feet or less. **Harbor of Refuge** affords good protection during easterly gales.

**Breakwater Harbor**, between the inner breakwater and the shore, is excellent for light-draft vessels in all weather except heavy northwesterly gales and even then affords considerable protection.

The inner breakwater begins 0.3 mile southwest of the tip of **Cape Henlopen** and extends 0.8 mile in a west-northwest direction. **Delaware Breakwater Light** ( $38^{\circ}47.8' \text{ N.}$ ,  $75^{\circ}06.0' \text{ W.}$ ), 61 feet above the water, is shown from a brown conical tower on the east end of the breakwater; the station has a fog signal. A low-power light is shown from a black skeleton tower on the west end of the breakwater.

A channel with a controlling depth of about 15 feet passes through **Breakwater Harbor** to the ferry basin 1.5 miles southwestward of **Cape Henlopen**. The large fish piers on the south side of **Breakwater Harbor** have depths of 15 feet or more at the outer ends.

The **Lewes** terminal of the **Cape May-Lewes Ferry** is 1.3 miles southwest of **Delaware Breakwater Light**. The basin at the terminal, protected on the west by a breakwater marked by lights and a fog signal, and the dredged channel leading northward through **Breakwater Harbor**, have a controlling depth of about 17 feet. A Coast Guard station is just west of the ferry terminal. Depths in other parts of **Breakwater Harbor** are 5 to 12 feet.

**Chart 1218.**—The low, marshy southwestern shore of **Delaware Bay** has few prominent marks above **Cape Henlopen**. There are scattered groups of houses, a few observation towers, and the lights and ranges of the tributaries.

The tributaries are narrow and crooked, and vessels have difficulties in making some of the turns. These streams are little used except by local fishing boats and by vessels carrying petroleum products to the towns along the banks. Strangers seldom attempt to enter. When entering or leaving these tributaries, allowance should be made for the bay currents which set across the entrances and have considerable velocity at times.

There are many shoal spots with depths as shallow as 2 to 6 feet between **Cape Henlopen** and **Bombay Hook Point**. Most of the spots are unmarked and are subject to some change, both in depth and position. Strangers

should proceed with caution in any of the passages southwest of the ship channel.

A line of fairway buoys marks a passage along the southwestern side of **Delaware Bay** from a point about 8 miles northwest of **Cape Henlopen** and 3 miles offshore to the lighted bell buoy 1.5 miles off the entrance to **Murderkill River**. The passage is used by most vessels entering or leaving the tributaries, and is said to lead clear of dangers if the buoys are followed closely, but it is close to the shoal spots in some places. The many fish and oyster stakes in the area also are to be avoided. The passage should not be attempted at night.

Vessels entering the southwestern passage from northward usually leave the main ship channel about 2.5 miles below **Ship John Light** and head in a southerly direction for the vicinity of the lighted bell buoy off **Murderkill River**. A depth of 7 feet can be carried through this passage, but care is necessary to avoid the 4-foot spot 2 miles off **Little River**.

**Mispillion River**, which empties into **Delaware Bay** from the west 13 miles northwest of **Cape Henlopen**, is used by pleasure and fishing craft, and oil barges bound for **Milford**. In 1964 the controlling depth was 6 feet to the fixed highway bridge at **Milford**, 10 miles above the mouth.

The entrance is protected by jetties, about 200 feet apart, which extend about a mile southeastward from shore. The southwest jetty end is marked by a light. The mean range of tide is 4.6 feet in the entrance. The current velocity is 1.5 knots on the flood and 1.0 knot on the ebb. Gasoline and water can be obtained at a small landing just inside the mouth of the river. The oil terminal about a mile below **Milford** has about 8 feet alongside, and the wharves at **Milford** have 5 to 7 feet alongside, mud bottom.

The highway bridge about 0.5 mile below **Milford** has a bascule span with a width of 45 feet and a clearance of 5 feet; see **203.237a**, chapter 2, for drawspan regulations. Just below the **Milford** fixed highway bridge, which is the head of navigation, is a marine railway that can haul out boats up to 55 feet for repairs. A full line of marine supplies is available at **Milford**. Just below the first highway bridge, 0.5 mile below **Milford**, there is a marine railway that can haul out boats up to 47 feet for repairs.

A danger zone of a naval aircraft bombing area extends 2 miles offshore just north of the entrance to **Mispillion River**; see **204.24**, chapter 2, for limits and regulations.

**Murderkill River**, 21 miles northwestward of **Cape Henlopen**, is used by fishing boats and a few pleasure craft. In 1963 the controlling depth was 5 feet through the dredged entrance channel to **Frederica**, 6.5 miles above the mouth. The mean range of tide is 4.8 feet in the entrance.

A lighted range and buoys mark the entrance to **Murderkill River**, and a lighted bell buoy about 1.5 miles offshore is near the intersection of this range and the range for entering **St. Jones River** to the northward.

**Bowers**, a summer resort on the north side of the entrance to Murderkill River, is prominent from offshore. Fuel and some supplies are available. A marine railway across the river from Bowers can haul out boats up to 50 feet for repairs. The wharves along Murderkill River are used extensively by fishing and oyster boats. The overhead cables crossing the river at Bowers have a clearance of 50 feet. The fixed highway bridge, 6 miles above the mouth, has a clearance of 12 feet.

**St. Jones River**, 0.5 mile north of Murderkill River, leads to the city of **Dover**, the capital of Delaware. In 1965 the controlling depths were less than a foot in the marked entrance channel, thence 4 feet to Lebanon, and about 3 feet to Dover. The mean range of tide is 4.8 feet in the entrance; the current velocity is about 0.7 knot.

A highway bridge over St. Jones River at **Barkers Landing**, 3 miles above the mouth, has a bascule span with a clearance of 5 feet. A highway bridge at **Lebanon**, 6 miles above the mouth, has a swing span with a width of 29 feet and a clearance of 6 feet. The overhead power cable at the drawbridge has a clearance of 50 feet. See 203.237, chapter 2, for drawspan regulations for St. Jones River. The fixed highway bridge 9 miles above the mouth has a clearance of 11 feet. There are no landings at Dover.

**Little River**, 26 miles northwest of Cape Henlopen, has about 1 foot in the marked entrance channel, thence 1 foot to the highway bridge at the town of **Little Creek**, 2 miles above the mouth. The mean range of tide is 5.4 feet in the entrance.

**Mahon River**, 27 miles northwest of Cape Henlopen, is used by commercial fishing boats; small tankers and barges deliver petroleum to the Air Force base pier at the entrance. The controlling depth is about 8 feet in the privately marked entrance channel with deeper water inside. Fuel and some supplies can be obtained at a landing 0.8 mile above the mouth.

**Leipsic River**, 30 miles northwestward of Cape Henlopen, is used occasionally by fishermen. The controlling depth is about 5 feet from Delaware Bay to Leipsic, 7 miles above the mouth. The entrance is marked by a lighted range. The mean range of tide is 5.5 feet in the entrance and 3.5 feet at Leipsic. The wharves at **Leipsic** have depths of 5 to 8 feet alongside; gasoline and some supplies are available. The fixed highway bridge at Leipsic has a clearance of 13 feet.

**Smyrna River**, 39 miles northwest of Cape Henlopen, is navigable to **Smyrna Landing**, about 8 miles above the mouth and 1 mile from the town of **Smyrna**. The controlling depth is about 3 feet to Smyrna Landing.

The jettied entrance to Smyrna River is marked by a light and a lighted range. Within the river the best water generally follows a midchannel course or favors the ebb-tide bends.

The mean range of tide is 5.8 feet in the entrance to Smyrna River and 3.5 feet at Smyrna Landing. The current velocity is about 1.5 knots in the entrance. The highway bridge at **Flemings Landing**, 3 miles above the mouth,

has a swing span with a width of 36 feet and a clearance of 5 feet; the bridge is seldom opened as the river is little used above the bridge. A small marine railway at **Flemings Landing** can haul out boats up to 35 feet in length; gasoline is available.

The New Jersey side of Delaware Bay is low, with few prominent marks. The principal tributaries are Maurice and Cohansey Rivers, which can be used as harbors of refuge by small boats going between Cape May Canal and the Chesapeake and Delaware Canal; there are also many small creeks used mostly by fishing boats. General depths along this side of the bay are 7 to 15 feet, but there are many spots with depths of less than 6 feet. The shoals generally are not marked and some local knowledge is needed to avoid them. Most of the creeks have bars across their mouths.

The channels have strong currents, and many tide rips form near Prissy Wicks Shoal. In Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb. In the channel immediately northwestward of Overfalls Shoal, the velocity is 1.1 knots on the flood and 1.6 knots on the ebb.

**Cape May Canal**, 2 miles northward of Cape May Light, is described in chapter 5 in connection with the New Jersey Intracoastal Waterway. Farther north are several creeks, the first of any importance to navigation being **Bidwell Creek**, a drainage canal 12 miles north-northeastward of Cape May Light. The canal has depths of about 3 feet at the jettied entrance and deeper water inside to the fixed highway bridge 1.5 miles above the jetties.

**Deadman Shoal**, 9.5 miles north-northwestward of Cape May Light, has a minimum depth of 3 feet and is marked by buoys. A ridge with depths of 5 to 7 feet begins a mile westward of Deadman Shoal and extends southward about 3 miles.

**Dennis Creek**, 14 miles north-northeastward of Cape May Light, has depths of about 2 feet over the flats at the mouth and much deeper water inside to **Jakes Landing**, about 3 miles upstream. The creek is navigable for a considerable distance, but has no commerce and is little used.

**Maurice River** flows into the northeast corner of **Maurice River Cove** 17 miles north-northwestward of Cape May Light. A white abandoned lighthouse is prominent on **East Point**, on the east side of the entrance. Large shellfish plants are along the lower part of the river; shipbuilding facilities are located at several of the towns from Leesburg to Millville.

Controlling depths in Maurice River are about 7 feet to Bivalve, thence 5 feet to Millville. The entrance channel is marked by buoys and a lighted range; seasonal buoys mark the channel from Bivalve to Millville.

For about 15 miles above the mouth of Maurice River the channel is easily followed, but a sharp lookout is necessary to avoid stakes and dolphins extending into the river, many of which are broken off and covered at

high water. Without local knowledge, it is safer to navigate this part of the river on a rising tide and proceed with caution. The upper part is narrow but not difficult to navigate when the buoys are on station.

The mean range of tide is 5.7 feet in the entrance to Maurice River and 6 feet at Millville. The current velocity is 1 knot in the entrance and 2.3 knots at Mauricetown; at Millville, the flood is very weak and the ebb velocity is 0.4 knot. Owing to dereliction of the dikes along the river, greater current velocities have been reported; extreme care is required in docking.

Ice may be encountered on Maurice River from the latter part of December through the early part of March.

The shellfish industry is concentrated along the lower part of Maurice River with plants at the towns of Bivalve, Maurice River, and Shell Pile, southeast of Port Norris, about 3 miles above the mouth. The wharves have depths greater than 7 feet alongside. Gasoline is available. See appendix for storm warning displays.

There are several marinas 4.5 and 6 miles above the mouth of Maurice River where some supplies, fuel, and slips are available. Repairs can be made; largest marine railway, 55 feet.

The shipyard at Leesburg, 7 miles above the mouth, has a 120-foot marine railway and a 20-ton lift. At Dorchester, 9 miles above the mouth, the shipyard has a 165-foot marine railway. A marina at Dorchester has gasoline, slips, a 50-foot marine railway, and a 9-ton lift. Repairs can be made at all of the facilities.

Mauricetown, 10 miles above the mouth, has a 65-foot marine railway; repairs can be made. The highway bridge over the river at Mauricetown has a swing span with a clearance of 3 feet; the overhead power cable on the south side has a clearance of 67 feet.

Port Elizabeth, a mile up Manumuskin River 12 miles above the mouth of Maurice River, has a small boatyard with a 45-foot marine railway; repairs and gasoline are available. About 1.5 miles above Port Elizabeth on Maurice River is another boatyard with a 40-foot marine railway; repairs can be made.

Millville, 20 miles above the mouth of Maurice River, has several factories but no municipal docks. The head of navigation is the milldam. The overhead power cable a mile south of Millville has a clearance of 67 feet. The first highway bridge has a 35-foot swing span with a clearance of 4 feet; see 203.225, chapter 2, for drawspan regulations. The fixed highway bridge 0.2 mile upriver has a clearance of 12 feet. A boatbuilder just below the drawbridge will make emergency repairs to boats up to 35 feet in length.

Egg Island Point, 17 miles north-northwest of Cape May Light, is marked by a light. Southward of the point are Egg Island Flats, which have depths as little as 3 feet; the shallowest parts are marked by buoys. The flats are thick with oyster-bed stakes. Between Egg Island Point and the inner end of the flats is a slough, with depths of 7 feet, used by local boats.

Fortescue Creek, 4 miles north-northwestward of Egg Island Point, has a light on the south side of the entrance. The creek is reported to have depths of 3 feet to the highway bridge at Fortescue, a small summer settlement on the south side 0.4 mile above the entrance. Gasoline and some supplies can be obtained. Near the bridge are two marine railways that can haul out boats up to 45 feet in length; a nearby machine shop can make hull and gasoline engine repairs.

Nantuxent Point, 8 miles northwestward of Egg Island Point, is on the southeast side of the entrance to Nantuxent Cove. A light marks the point and a buoy marks the outer limit of the 5- and 6-foot spots that extend over a mile offshore from the point.

Nantuxent Creek, on the northwest side of Nantuxent Point, has depths of about 5 feet in the mouth and is navigated at high water by local oyster boats for about 5 miles to within a mile of the village of Newport. At Money Island, the town about 1.2 miles above the mouth, there are several marine railways that can haul out boats up to 50 feet in length.

Back Creek, 27 miles northwest of Cape May Light and 2 miles northwestward of Nantuxent Point, is used by local boats as an anchorage. The creek has depths of about 5 feet over the flats at the entrance and good depths for several miles above. Gasoline, some supplies, and slips are available at a landing 5 miles above the mouth. Boats up to 50 feet can be hauled out for repairs.

Ben Davis Point is on the northwest side of the entrance to Nantuxent Cove. It is marked by a light. Shoals to be avoided are the 1-foot spot a mile southwest of the point and 5-foot Ben Davis Point Shoal, which is 2.5 miles south by west of the point and within 0.7 mile of the main channel through the bay.

Cohansey River, which empties into the northeast side of Delaware Bay 31 miles northwestward of Cape May Light, is used mostly by pleasure craft, although some petroleum is transported to Bridgeton. Cohansey Light (39°20.5' N., 75°21.7' W.), 42 feet above the water, is shown from a skeleton tower on a concrete foundation on the south side near the natural entrance. A dredged cut through the narrow neck of land on which the light stands gives a more direct approach to the river; the cut, 0.3 mile northwest of Cohansey Light, is marked on its west side by lights at the inner and outer ends; seasonal buoys mark the channel above Greenwich Pier to Bridgeton. The controlling depths are about 9 feet to Greenwich Pier, thence 5 feet to a point 0.2 mile below the first bridge at Bridgeton; above this point, depths are less than 2 feet.

The usual approach to Cohansey River is along the axis of the dredged cut, but the natural channel eastward of Cohansey Light is sometimes used; the latter has a controlling depth of about 7 feet, and unmarked shoals with depths of 4 to 6 feet must be avoided on either side. Within the river, the natural channel has ample width and depth to within a mile of Bridgeton; thence to Bridge-

ton is a dredged channel which requires some local knowledge to follow.

The mean range of tide is 6.0 feet in the entrance and 6.5 feet at Bridgeton; high water at Bridgeton is about 2 hours later than at the entrance. The current velocity is about 1.3 knots half a mile above the entrance and less than 0.5 knot at Bridgeton.

There are small-craft facilities near **Greenwich Pier**, 4 miles above the mouth, and at **Fairton**, 14 miles above the mouth. Fuel, supplies, and slips are available. Maximum haulout capacities for repairs are: railway, 50 feet; lift, 20 tons.

**Bridgeton**, 17 miles above the mouth, is an important manufacturing town and rail center, but has no municipal docks or public marinas. The 40-foot bascule span bridge at Bridgeton has a clearance of 6 feet but does not open for vessels; see 203.225, chapter 2. The overhead power cable 0.2 mile below the bridge has a clearance of 44 feet.

**Chart 294.—Bay Side (39°22.8' N., 75°24.2' W.)** is a fishing resort on the east side of the entrance to **Stow Creek**. The creek has some traffic for 10 miles to Stow Creek Landing. Gasoline and some supplies are available at Bay Side.

The dividing line between **Delaware River** and Delaware Bay is 42 miles above the Delaware Capes. The line, defined arbitrarily by the legislatures of Delaware and New Jersey, extends from a monument on **Liston Point**, Del., to a similar monument on the south side of the entrance to **Hope Creek**, N.J.

**Artificial Island**, Mile 44E, is the name given to the peninsula formed by the filled area covering most of **Baker Shoal**.

**Local magnetic disturbance.**—Differences of as much as 2° to 5° from normal variation have been observed along the channel from Artificial Island to Marcus Hook.

**Alloway Creek**, Mile 47.5E, has a controlling depth of about 3 feet to Quinton. The approach to Alloway Creek is unmarked, and the shoals on either side of the mouth must be avoided. Above the mouth the best water is not always in midstream, and some local knowledge is needed to find it. The mean range of tide is 5.5 feet in the entrance and 4.0 feet at Quinton. The current velocity is 2.1 knots 0.2 mile above the entrance and about 1.4 knots at New Bridge. A marina 1.5 miles above the mouth has fuel, slips, and some supplies. A 15-ton lift can haul out boats for repairs.

**Hancocks Bridge**, 4 miles above the mouth of Alloway Creek, has a swing span with a width of 40 feet and a clearance of 4 feet; the best water is in the north opening. An overhead power cable on the west side of the bridge has a clearance of 50 feet. **New bridge**, 5.5 miles above the mouth, has a swing span with a width of 35 feet and a clearance of 3 feet. The highway bridge at **Quinton**, 8 miles above the mouth, has a swing span with a width of 30 feet and a clearance of 3 feet. See 203.225, chapter 2, for drawspan regulations. An overhead power

cable on the west side of the bridge has a clearance of 50 feet.

**Salem River** is entered through **Salem Cove** at Mile 50E, across the Delaware River from the entrance to the Chesapeake and Delaware Canal. Commerce on Salem River is almost entirely in petroleum products. The approach channel follows the southeast side of Salem Cove for about 2 miles to the mouth of the river; it is marked by buoys and a lighted range. Within the river, the channel enters a land cut 0.8 mile above the mouth and returns to the river 1.3 miles from the mouth; the river channel is marked by buoys as far as the cut. The controlling depth is about 12 feet through the cut to the first bridge at Salem and 8 feet in the bend; above the bridge the depths are 2 feet or less.

The mean range of tide is 5.6 feet in the entrance and at Salem; the tides at Salem are about 20 minutes later than at the entrance. The current velocity is about 1.6 knots in the entrance. The maximum expected current in the land cut is 3 knots.

The highway bridge 1.8 miles above the mouth has a bascule span with a clearance of 5 feet; the overhead power cable below the bridge has a clearance of 65 feet.

Several boatyards and marinas are along the north bend of Salem River and at Salem. Gasoline, supplies, and slips are available. Maximum haul-out capacities for repairs are: marine railway, 50 feet; lift, 14 tons.

**Appoquinimink River**, Mile 44W, has no commerce, and is little used except by pleasure craft and a few fishing boats. Controlling depth to Odessa is about 2 feet. The mean range of tide is 5.7 feet in the entrance; the current velocity is about 1.1 knots. The highway bridge 3 miles above the mouth has a swing span with a width of 39 feet and a clearance of 7 feet; see 203.236, chapter 2, for drawspan regulations. The swing bridge at **Odessa**, 5.5 miles above the mouth, has a clear opening 40 feet wide and a clearance of 4 feet, but has not been opened for many years.

**Reedy Island**, Mile 48W, is the site of a former Federal quarantine and detention station. The pier on the channel side of the island has a depth of 10 feet at the outer end; the current velocity is about 2.5 knots off the pier. A dike extends 3 miles southward from Reedy Island and roughly parallels the western shore; the dike is marked by lights, and a buoy is moored off the submerged southern end.

**Port Penn** is a village on the western shore opposite Reedy Island. The best approach to the village is through an opening in the Reedy Island dike; the opening, 0.2 mile south of the island, is 5 feet deep and 150 feet wide, and marked on each side by a daybeacon. Approaches to the village from north of Reedy Island or from south of the dike are over flats with depths of 2 feet. Anchorage depths off Port Penn are 15 feet or more, but depths at the piers are relatively shallow.

The **Chesapeake and Delaware Canal**, Mile 51W, is described in chapter 7.

**Pea Patch Island**, Mile 53W, is the site of old **Fort Delaware**. The wharf, on the main channel, is marked by a light. A dike, mostly submerged at high water, extends northward along **Bulkhead Shoal** for about 3 miles from Pea Patch Island; the dike is marked by lights and daymarkers. The current velocity is 2.3 knots in the main channel east of the island.

**Delaware City** is on the southwest side of Delaware River opposite Pea Patch Island. **Delaware City Branch Channel**, which extends southward from the riverfront of the town to the Chesapeake and Delaware Canal, has a controlling depth of about 3 feet. Depths alongside the Delaware City bulkhead are 6 to 2 feet.

A dredged cut with a controlling depth of about 27 feet, marked by a privately maintained 306° lighted range and buoys, extends northwestward through **Bulkhead Shoal Channel** from Delaware River main channel to the Tide-water Associated Oil Company terminal on the northwest side of Delaware City. The current velocity is 2.1 knots between Pea Patch Island and Delaware City. Fresh water is available on the wharves, and vessels can be bunkered at the rate of 2,000 barrels an hour from each of three berths.

**New Castle**, Mile 57W, has little waterborne commerce. The principal public wharf has depths of 15 feet along-side. The yacht basin is reported to go dry at low water and with adverse winds. Several stone fenders that stand about 5 feet above high water protect the wharves from drifting ice.

**Pennsville**, Mile 58E, has a small marina. Gasoline, slips, and some supplies are available. An 8-ton lift can haul boats out for repairs.

**Delaware Memorial Bridge**, Mile 60, has a suspension main channel span clearance of 188 feet. In 1966 a parallel suspension bridge with the same clearance was under construction just north of the Memorial Bridge.

**Salem Canal**, at the east end of the bridges, once gave access to the upper part of Salem River. The route is now blocked in several places, the first being at a dam about 300 yards above the mouth.

**Deepwater Point**, 0.6 mile above the New Jersey end of the Memorial Bridge is the site of a large chemical plant and has a long main wharf and a railroad car-float bridge. The main wharf has depths of 30 feet at the face.

**Pigeon Point**, Mile 60.5W, has a railroad car-float bridge. Railroad cars are barged to Deepwater Point and Thompson Point.

**Christina River**, Mile 61.5W, is the approach to the city of Wilmington and to the towns of Newport and Christina. A steel sheet-pile jetty 0.4 mile long is on the south side of the entrance to Christina River.

The entrance and first reach of the river channel are marked by lights and a lighted range.

**Wilmington Marine Terminal**, 0.7 mile above the mouth of Christina River, has depths of about 35 feet alongside its 3,060-foot marginal wharf. The terminal has rail and

highway connections, modern storage facilities, and mechanical freight-handling equipment; gantry cranes up to 110 tons and a bulk loader and unloader that can handle 1,000 tons an hour are available.

**Lobdell Canal**, on the south side of Christina River 0.9 mile above the mouth, is not used.

**Brandywine Creek**, on the northeast side of Christina River 1.6 miles above the mouth, has depths of about 4 feet to the railroad bridge 1 mile above its mouth. The channel is rocky above the railroad bridge, but depths of 1 to 2 feet can be carried 0.7 mile to Market Street bridge, above which there are rapids. The river is used mostly for anchorage and storage of pleasure boats.

**Wilmington**, on the north side of Christina River 2.5 miles above the mouth, has large manufacturing interests. Both sides of the river at the city are lined with wharves which will accommodate the drafts using the channels. Most of the waterborne commerce in general cargo, lumber, grain, and ore is handled at the Wilmington Marine Terminal.

**Newport**, on the north side 8 miles above the mouth, is at the head of practical navigation.

**Channels**.—Federal project depth is 35 feet from Delaware River to the Wilmington Marine Terminal. Because the channel is subject to frequent shoaling, consult the chart and Notice to Mariners for latest controlling depth.

Above the terminal, controlling depths are about 13 feet for 3.7 miles above the mouth, thence 6 feet to the railroad bridge 5 miles above the mouth. Above this point local knowledge is necessary due to changes in the channel alinement and construction of fixed bridges.

**Anchorage**.—Vessels must not anchor in Christina River channel within the city limits of Wilmington or tie up at any wharf more than two abreast without permission of the harbor commissioners. An anchorage area is off Deepwater Point, south of the river entrance; see 202.157, chapter 2, for limits and regulations.

See appendix for **Wilmington climatological table**.

**Bridges**.—There are no bridges over the deep-water section of Christina River. The least clearance is 2 feet of the drawbridges from the railroad bridge, 1.4 miles above the mouth, to the bridge 5 miles above the mouth; see 203.235, chapter 2, for drawspan regulations. The minimum clearance is 70 feet of the power cables in this section of the river.

The highway bridge over Brandywine Creek, 0.1 mile above the mouth, has a swing span with a width of 48 feet and a clearance of 10 feet; see 203.230, chapter 2, for drawspan regulations. The power cable on the lower side of the bridge has a clearance of 59 feet.

The railroad bridge about a mile above the mouth of Brandywine Creek and the highway bridges above it have fixed spans with a minimum width of 40 feet and a clearance of 10 feet. The overhead power cable 300 yards above the railroad bridge has a clearance of 34 feet.

**Tides and currents**.—The mean range of tide is 5.7 feet at Wilmington. The current velocity is about 0.8 knot.

**Quarantine.**—The quarantine station is at Marcus Hook, 7 miles up Delaware River from Wilmington. The Public Health Service has an outpatient office in Wilmington.

**Customs.**—Wilmington is a Customs port of entry at which marine documents are issued.

**Immigration and naturalization.**—At the port of Wilmington inbound vessels carrying aliens are boarded at the docks by immigration inspectors from Philadelphia, who will, after examining passengers, either grant them entry or direct the vessel to hold them for further examination.

**Harbor regulations.**—The speed of vessels in Christina River is limited to 8 miles per hour; see **207.80**, chapter 2.

**Supplies.**—Water can be supplied at the Wilmington Marine Terminal from the city mains. The nearest facilities for supplying deep-draft vessels with bunker oil are at Delaware City and Marcus Hook. Light-draft vessels can obtain fuel at a wharf on the south side of Christina River just above the second bridge; the depth at the wharf is about 8 feet. Small craft can obtain gasoline and supplies at Wilmington near the second bridge over Christina River.

**Repairs** can be made to light-draft vessels and small craft at the boatyards near the second bridge on Christina River; largest marine railway, 110 feet. Small-craft repairs can also be made at a boatyard above the second bridge on Brandywine Creek.

**Communications.**—Wilmington is served by three railroads. The principal airport is the New Castle County Airport, 5 miles southwest of Wilmington; regular scheduled passenger service is maintained.

**Chart 295.**—**Carney Point**, Mile 61.8E, across Delaware River from Christina River, is the site of a powder factory. A tank and a stack are prominent.

**Penns Grove**, Mile 63E, is a railroad terminus. The unused wharf at the town has a depth of about 12 feet at the outer end.

**Edgemoor** is directly across Delaware River from Penns Grove. The two government piers at Edgemoor have depths of 17 feet at their ends and 15 feet in the basin between them. The Corps of Engineers has a suboffice at the basin. About 400 yards to the southwestward is a wharf with depths of 16 feet alongside.

The Corps of Engineers has requested masters to limit speed to 6 knots when passing piers and wharves along Delaware River in order to avoid damage caused by excessive wave action.

A dike with its outer end submerged extends 0.3 mile offshore from **Oldmans Point**, on the eastern shore of Delaware River 2 miles above Penns Grove. About 0.3 mile southward of the dike are the ruins of a long pier.

**Oldmans Creek**, Mile 66E, has a controlling depth of about 3 feet in the buoyed entrance channel, thence 5 feet

to **Pedricktown**, 3.6 miles above the mouth. The mean range of tide is 5.6 feet in the entrance.

The limiting clearance of the three drawbridges between the entrance and Pedricktown is 1 foot; the minimum width of openings is 36 feet. See **203.225**, chapter 2, for drawspan regulations. The vertical lift highway bridge at **New Bridge**, 1.9 miles above the mouth, has a clearance of 4 feet down and 64 feet up. Gasoline is available at a small marina at New Bridge; some repairs can be made.

**Marcus Hook**, Mile 69N, is an important center at which large quantities of crude oil are received. The oil companies at Marcus Hook have wharves with depths of 30 to 40 feet at their faces; vessels can be bunkered at the rate of 1,500 to 5,000 barrels per hour. The companies also operate barges for bunkering in the streams or alongside other wharves.

A Federal quarantine station for Delaware River ports is maintained at the foot of Market Street in Marcus Hook by the U.S. Public Health Service. The station wharf has a depth of 14 feet at the outer end. Regulations governing use of the wharf are given in **207.90**, chapter 2.

A daytime reporting station of the Philadelphia Maritime Exchange is on the Sun Oil Wharf at the lower end of the city waterfront.

On the southeast side of the main ship channel opposite Marcus Hook is a preferential anchorage for vessels awaiting quarantine inspection; see **202.157**, chapter 2, for limits and regulations. The current velocity is about 1.7 knots.

**Raccoon Creek**, Mile 70S, is the approach to the towns of Bridgeport and Swedesboro. The creek carries some traffic in fertilizer and fertilizer materials. The approach to Raccoon Creek is a channel that extends west-southwestward through the shallow flats for 1.1 miles from the mouth. The controlling depths are about 4 feet to Bridgeport, and thence 3 feet to Swedesboro.

The approach channel is marked by buoys, and a light marks the outer end of the rock jetty on the south side of the entrance. The mean range of tide is 5.7 feet in the entrance.

The highway bridge at **Bridgeport**, 1.5 miles above the mouth, has a vertical-lift span with clearance of 4 feet down and 64 feet up. The railroad bridge 0.3 mile above the highway bridge has a swing span with a width of 38 feet and a clearance of 7 feet; see **203.225**, chapter 2, for drawspan regulations. Gasoline is available just before the first bridge. A boatyard just south of the railroad bridge can make minor repairs; marine railway, 50 feet.

Between Bridgeport and **Swedesboro**, 7.1 miles above the mouth, the least bridge clearances are: swing bridge, 50 feet horizontal, 6 feet vertical; fixed bridges, 33 feet horizontal, 8 feet vertical. The overhead power cable clearance is 75 feet.

An overhead power cable across Delaware River at Mile 70.5, near the northeast end of Marcus Hook Range, has a clearance of 210 feet.

A ferry landing on the southeast side of Delaware River, 0.7 mile above Raccoon Creek, serves the cross-river passenger and vehicular ferry to Chester.

**Chester**, Mile 72N, is an important manufacturing center, and many of its industries use the wharf facilities along the 3-mile waterfront. The nearest designated anchorage is off Marcus Hook. Chester is a customs port of entry.

Most of the wharves at Chester have depths of 15 to 20 feet at their faces; some have as little as 5 feet. Water is piped to the principal wharves. The **Chester Tide-water Terminal**, near the lower end of the waterfront, has 35 feet alongside. There are storage facilities, mechanical transfer equipment, and rail and highway connections.

Complete repairs to large vessels can be made at the Sun Shipbuilding and Drydock Company plant at Chester. The largest floating drydock has a length of 775 feet, a width of 140 feet between wing walls, and a lifting capacity of 38,000 tons.

**Chester Creek** empties into Delaware River about at the mid-point of the city waterfront. The railroad bridge just above the mouth has a swing span with a clearance of 1½ feet; see **203.229**, chapter 2, for drawspan regulations. Above that point, navigation is restricted by the 6-foot minimum clearance of the fixed bridges. The controlling depth is about 2 feet to the second bridge, 0.2 mile above the entrance. The mean range of tide is 5.7 feet in the entrance.

The current velocity is 1.7 knots on the flood and 2.2 knots on the ebb off **Eddystone**, Mile 73N.

**Darby Creek**, Mile 74N, has a controlling depth of about 7 feet to the highway bridge 1.2 miles above the mouth. The railroad bridges, 0.3 mile above the mouth, have bascule spans with minimum clearances of 3 feet; see **203.228**, chapter 2, for drawspan regulations. The fixed highway bridge just above the railroad bridges has a clearance of 22 feet and the fixed highway bridge 1.2 miles above the mouth has a clearance of 8 feet. Oil barges and small tankers go to the wharf with about 7 feet alongside just below the railroad bridges; above this point the creek is used only by small pleasure craft.

**Essington**, Mile 75N, is the center and fitting-out point for the majority of the yachts in the Philadelphia area. Between Essington and Delaware River main channel is marshy **Little Tinicum Island**, which is about 2 miles long. There is a dike along the north shore of the passage east and north of Little Tinicum Island. An unmarked channel parallel to and about 450 feet from the centerline of the dike has a controlling depth of about 5½ feet; shoals are on both sides of the channel. Local vessels usually pass around the west end of the island where the controlling depth is about 9 feet.

A special small-craft anchorage area is between the Essington waterfront and Little Tinicum Island; see **202.1** and **202.67**, chapter 2, for limits and regulations. Depths are 9 to 16 feet in the anchorage. The current velocity is about 1.3 knots. Fuel and supplies are avail-

able at Essington. Complete repairs can be made; largest marine railway, 125 feet.

A railroad car-float bridge is on **Thompson Point** on the New Jersey side opposite the west end of Little Tinicum Island. Between Thompson Point and **Crab Point**, 0.5 mile to the eastward, are the large buildings of a chemical plant. The principal wharves on Crab Point have depths of 32 feet at their faces. A general anchorage area is between the two points and the south side of the main channel; see **202.157**, chapter 2, for limits and regulations. The current velocity is about 2 knots a half mile east of Crab Point.

There are several large petroleum facilities at **Paulsboro**, Mile 77S. The 2,500-foot bulkhead wharf of an oil refinery on **Bramell Point** at the west end of the waterfront has depths of about 35 feet alongside. The oil terminal 0.9 mile eastward of Bramell Point has depths of 40 to 37 feet alongside. The oil and chemical terminal, 1.5 miles eastward of Bramell Point, has depths of 29 to 35 feet alongside. Vessels can be bunkered at the rate of 1,000 to 7,500 barrels per hour at these facilities. Fuel is also available from barges.

**Mantua Creek**, Mile 78S, passes on the east side of Paulsboro and meanders southeastward to the vicinity of **Mantua**, 7.6 miles above the mouth. There is waterborne traffic in chemicals and paper to the first bridge; above which the creek is used only by small boats.

The Mantua Creek entrance jetties are marked by lights and the entrance channel is buoyed. The controlling depths are about 20 feet for 0.7 mile, thence 9 feet to **Friars Landing**, 2.3 miles above the mouth, thence 4½ feet to **Parkers Landing**, 4.5 miles above the mouth, and thence less than a foot to Mantua. The mean range of tide is 5.7 feet in the entrance.

The railroad bridge 1.3 miles above the mouth has a 32-foot-wide swing span with a clearance of 1 foot. The highway bridge, 1.5 miles above the mouth, has a vertical-lift span with clearance of 5 feet down and 64 feet up. Above this point the fixed bridges and overhead cables have minimum clearances of 10 feet and 50 feet, respectively.

The wharves below the first bridge on Mantua Creek have depths of 20 to 12 feet alongside.

A general anchorage area is on the southeasterly side of the main channel above the entrance to Mantua Creek; see **202.157**, chapter 2, for limits and regulations. The current velocity is about 2 knots in the channel opposite the anchorage.

Petroleum terminals are at Mile 78N. The 3,600-foot Hog Island Wharf has depths of 32 feet or more alongside. The 1,110-foot Fort Mifflin Terminal Wharf has depths of 30 feet or more alongside.

Old **Fort Mifflin**, Mile 79.5N, is the site of the Corps of Engineers wharves which have depths of 28 feet at the outer ends.

**Woodbury Creek**, Mile 79.5S, is used only by small craft. The entrance is buoyed but local knowledge is needed. The approach must be made from the northeast

or west-southwest because of the 2-foot shoal directly off the creek. At low water the channel within the creek is well defined. The controlling depth is about  $2\frac{1}{2}$  feet in the entrance with depths of 6 to 3 feet inside to the second bridge, 1.5 miles above the mouth. Above this point depths are less than 1 foot to **Woodbury**, 2.7 miles above the mouth. The mean range of tide is 5.7 feet in the entrance. The highway bridge 0.8 mile above the mouth has a swing span with a width of 39 feet and a clearance of 5 feet; see **203.225**, chapter 2, for drawspan regulations. Above this point the fixed bridges and overhead cables have minimum clearances of 4 feet and 45 feet, respectively.

**Chart 280.**—**Philadelphia**, one of the chief ports of the United States, is at the junction of Delaware and Schuylkill Rivers. The mid-harbor point along Delaware River is at Chestnut Street, Mile 86.5W.

The Port of Philadelphia, as defined for Customs purposes, comprises such waters of the Delaware and Schuylkill Rivers bordering on the Municipality as are navigable; the municipal limits on Delaware River extend from Fort Mifflin on the south to Poquessing Creek on the north, a distance of about 20 miles.

Large quantities of general cargo are handled at the port in both foreign and domestic trade. In addition, crude petroleum and petroleum products, sugar, and ore are imported, while coal, grain, and refined petroleum products are exported. Coastwise receipts are mostly crude petroleum and petroleum products, and shipments consist chiefly of refined petroleum products.

**Channels.**—Federal project depth is 40 feet from the sea through the main channel in Delaware Bay and River to the Philadelphia Naval Shipyard. Mile 81, thence 40 feet on the west side and 37 feet on the east side through Philadelphia Harbor to Allegheny Avenue, Mile 89, thence 40 feet to the United States Steel basin opposite Newbold Island, Mile 110, and thence dredging depths of 25 feet to Trenton, Mile 115. Controlling depths are published frequently in Notice to Mariners.

**Note.**—In the Philadelphia-Trenton section of the river, masters are especially requested to limit speed of their vessels when passing wharves and piers so as to avoid damage by suction or wave wash to property or persons.

**Anchorages.**—See **202.157**, chapter 2, for limits and regulations.

**Bridges.**—**Walt Whitman Bridge**, Mile 84, a highway suspension bridge connecting Philadelphia with Gloucester City, has a clearance of 150 feet at the center of the main span, and minimum clearance of 139 feet under the full width of the main span. **Benjamin Franklin Bridge**, Mile 86.8, 0.3 mile above Chestnut Street, has a suspension span with a clearance of 135 feet.

**Tides.**—The mean range of tide is 5.9 feet at Philadelphia; see the Tide Tables for daily predictions.

**Towage.**—A large fleet of tugs is available at Philadelphia, day and night, for any type service required.

As a general rule, tugs are not required for vessels moving between Philadelphia and the sea; most vessels traverse this distance under their own power.

**Quarantine.**—The national quarantine station at Marcus Hook is maintained by the U.S. Public Health Service primarily as a boarding station. Administrative offices and an outpatient clinic are in Philadelphia.

**Customs.**—Philadelphia is a Customs district headquarters. Marine documents are issued.

**Immigration.**—The Immigration and Naturalization Service maintains a district office and an entry and departure office in Philadelphia.

**Harbor regulations.**—Local rules and regulations are enforced by the Navigation Commission for the Delaware River (Pennsylvania). The authority of the Commission extends from the Pennsylvania-Delaware boundary line on the south to the head of the navigable waters of Delaware River on the north.

**Wharves.**—Philadelphia has more than 160 piers, wharves, and docks along its Delaware River front and along Schuylkill River. Practically all piers have direct connections with the railroads. Most of the general cargo piers are between Walt Whitman Bridge and **Port Richmond**, 2 miles above Benjamin Franklin Bridge, and at **Ten Mile Point**, 7 miles above the Franklin Bridge. Coal and ore are handled at the facilities south of **Greenwich Point**, just below the Walt Whitman Bridge. Coal, ore, grain, and other bulk cargo are also handled at Port Richmond. Depths at most of the principal facilities are about 30 feet, but some have greater depths.

Cranes and derricks with lift capacities up to 100 tons are available for public use at several piers, and arrangements for use of a 350-ton crane may be made with the Philadelphia Navy Yard on League Island. Large grain elevators are on Schuylkill River and at Port Richmond. Facilities for public storage of goods received or to be shipped by water include numerous warehouses and cold-storage facilities.

**Supplies.**—Water is available at practically all the waterfront facilities. Bunker oil can be obtained at the terminals along the Schuylkill River. Other bunkering terminals are at Delaware City, Marcus Hook, Paulsboro, Eagle Point, Petty Island, and Fisher Point Dike. Many vessels receive fuel from barges alongside.

**Repairs.**—Major repairs to large vessels can be made at the Sun Shipbuilding and Drydock Company at Chester and the New York Shipbuilding Corporation at Camden. Repairs to small vessels can be made at the shipyards on Cooper Point at Camden. Small-craft repair facilities are at Essington, Pa.

**Communications.**—Philadelphia is served by the Pennsylvania Railroad, the Baltimore and Ohio Railroad, and the Reading Railway. More than 75 steamship lines operate to and from the port. Several major airlines provide frequent scheduled services between Philadelphia International Airport, 5.5 miles southwest of City Hall, and domestic and overseas points.

**Schuylkill River**, Mile 80N, is navigable for 7.3 miles to **Fairmount Dam** and is an important outlet for a part of the commerce of Philadelphia.

The Federal project provides for a channel 33 feet deep to Passyunk Avenue bridge, 3.1 miles above the mouth, thence 26 feet deep to Gibson Point, 4 miles above the mouth, and thence 22 feet deep to University Avenue bridge, 5.3 miles above the mouth. Above that point most of the wharves have depths of about 12 feet at their faces.

A light marks the outer end of a sunken jetty on the east side of the entrance to Schuylkill River and a fog signal is on the west side. Lights, ranges, and buoys mark the channel within the river as far as the railroad bridge 4.5 miles above the mouth.

Within its project limits, Schuylkill River is crossed by five bridges, the first of which, the Penrose Avenue highway bridge 1.3 miles above the mouth, has a fixed span with a clearance of 135 feet. The others, all drawbridges, have a minimum clearance of 15 feet. See 203.227, chapter 2, for drawspan regulations.

Above the University Avenue bridge, the limiting clearance of the fixed bridges is 16 feet. The railroad bridge, 5.6 miles above the mouth, has a swing span with a clearance of 26 feet; see 203.227, chapter 2, for drawspan regulations.

The overhead power cable 250 yards below the Passyunk Avenue bridge has a clearance of 137 feet. The overhead cables above the University Avenue bridge have a minimum clearance of 70 feet.

The mean range of tide is 5.7 feet in Schuylkill River. The current velocity is about 0.5 knot in the entrance.

The shores of Schuylkill River have become the center of the petroleum industry at the Port of Philadelphia. Many piers and wharves along the river are controlled by oil companies. Vessels can obtain bunker oil at terminals on the north bank 1 mile above the mouth of the river, and at **Point Breeze**, 3 miles above the mouth. The piers for a large grain elevator and bulk-handling facilities are at **Girard Point**, 0.7 mile above the mouth. Depths at the faces of the bunkering terminals and facilities at Girard Point are about 30 feet. Most of the other wharves along the river have depths of 9 to 12 feet at their faces.

**League Island**, now a part of the mainland at the junction of Delaware and Schuylkill Rivers, is the site of the **Philadelphia Naval Shipyard**. The reservation has a frontage of 0.6 mile on the east side of Schuylkill River and 2 miles on the north side of Delaware River. **Reserve Basin**, in the northwest part of the reservation, is used to store vessels of the reserve fleet. A ferry operates across Delaware River from midway along the League Island waterfront to National Park, N.J.

A petroleum terminal east of **Eagle Point**, Mile 81.8S, has depths of 36 to 40 feet alongside its three berths. Vessels can be bunkered at the rate of 1,500 barrels per hour.

**Big Timber Creek**, Mile 82.9S, has a depth of about 4½ feet through the buoyed flats at the entrance with deeper water inside; local knowledge is needed to navigate the channel beyond the buoys. The minimum clear-

ance of the fixed bridges at **Westville**, a mile above the mouth, is 12 feet. About Westville the fixed bridges have a least clearance of 8 feet. The cables over the creek have a least clearance of 30 feet.

The oil and chemical wharves on the northeast side of the entrance to Big Timber Creek have depths of about 12 feet at their faces. Above here, the creek is little used except by pleasure craft. Several repair yards are along the creek, the largest of which can haul out boats up to 48 feet in length. Gasoline and some supplies are available.

**Gloucester City**, Mile 83.5E, is the site of large manufacturing plants. The waterfront is 1.3 miles long and depths at most of the wharves range from 5 to 15 feet, but the pier just below the Walt Whitman Bridge has depths of 30 feet or more at the face. A Coast Guard base is about midway along the waterfront. The current velocity is about 2.1 knots off Gloucester City.

**Newton Creek**, Mile 84.2E, forms the boundary between Gloucester City and Camden. Navigation is blocked 500 yards above the mouth by low fixed bridges.

**Camden**, N.J., is an important manufacturing and shipbuilding center directly opposite Philadelphia, with which its industrial and shipping activities are closely allied. The South Jersey Port Commission, with headquarters at Camden, has jurisdiction over the New Jersey ports bordering Delaware River from Trenton to the ocean. **Quarantine**, **customs**, and **immigration** are handled from the Philadelphia offices.

Camden is served by the Pennsylvania Railroad and the Reading Railway.

**Camden Marine Terminals**, Mile 86E, are used mostly for handling general cargo and lumber. Depths of 27 to 30 feet are alongside the 1,050-foot marginal wharf. The terminals have rail and highway connections, water connections, modern storage facilities, mechanical freight-handling equipment, and bulk conveyors handling up to 300 tons per hour; cranes will lift up to 20 tons.

Most of the other wharves along the Camden waterfront have depths of 6 to 25 feet at their faces; some of the bulkheads are dry or nearly so at low water.

Major repairs to large vessels can be made at the New York Shipbuilding Corporation facilities extending nearly a mile above the Walt Whitman Bridge. The usable dimensions of the graving dock are 1,100 feet long, 150 feet wide, and 35 feet over the sill. There are several shipyards at **Cooper Point**, above the Benjamin Franklin Bridge, that can make repairs to smaller vessels. The largest floating drydock has a capacity of 1,000 tons; the largest marine railway can haul out vessels up to 250 feet in length.

On the north side of **Petty Island**, Mile 89S, is a petroleum terminal. Its 745-foot marginal wharf has depths of 28 to 30 feet alongside. Vessels can be bunkered at the rate of 5,000 barrels per hour.

The channel between Petty Island and the New Jersey shore has a controlling depth of about 10 feet; both entrances are buoyed, but care is necessary to avoid the

foul ground extending from both shores. The railroad-highway bridge over the northeastern end of the channel has a bascule span with a clearance of 12 feet; see **203.225**, chapter 2, for drawspan regulations. Most of the boatyards along the New Jersey shore southward of Petty Island are inactive.

**Cooper River** empties into the south side of the channel back of Petty Island 0.6 mile above the southwest entrance. The controlling depth is about 12 feet to the railroad bridge, a mile above the mouth, thence 8 feet to just above the fourth bridge, 1.4 miles above the mouth. The channel through the flats at the entrance is buoyed. The mean range of tide is 5.9 feet in the entrance. The drawbridges over this section of the river have a minimum width of 34 feet and a clearance of 3 feet; see **203.225**, chapter 2, for drawspan regulations. The petroleum wharves near the railroad bridge have depths of 6 to 12 feet alongside.

Petroleum terminals are on **Fisher Point Di**ke, Mile 90S. Depths alongside are 28 to 33 feet. Vessels can be bunkered at the rate of 3,500 barrels per hour.

**Chart 296.**—Above Philadelphia, the 40-foot dredged channel continues to Newbold Island, Mile 110, thence the dredging depths are 25 feet to the Trenton Marine Terminal. Above this point, depths are about 10 feet to the railroad bridge.

The mean range of tide is 6.0 feet at Bridesburg and 6.8 feet at Trenton. Above Philadelphia the river usually is closed by ice for extended periods during January and February, and in severe winters navigation is practically suspended during these months; ice seldom forms before January.

During March and April, **freshets** 10 to 20 feet in height above mean low water may be expected at Trenton. The highest level is reached during the ice breakup in the spring; heavy rains do not ordinarily raise the level to more than 9 feet above mean low water. Freshets usually are not dangerous to shipping unless accompanied by ice. The 1903 freshet, highest on record, reached heights above low water of 21½ feet at Trenton, 19½ feet at Bordentown, and 13 feet at Bristol.

See appendix for **Trenton climatological table**.

The Pennsylvania Railroad Bridge, which crosses Delaware River from Bridesburg, Philadelphia, to Delair, Mile 90.6, has a vertical-lift span with clearances of 49 feet down and 135 feet up. The current velocity is 1.6 knots at the bridge.

The highway bridge that crosses Delaware River from Tacony, Philadelphia, to Palmyra, N.J., Mile 93, has a bascule span with a clearance of 53 feet. Gasoline is available for small craft at a small boatyard on the west side of the bridge at Tacony.

**Dredge Harbor**, Mile 96S, is a base for sand and gravel dredging equipment, and yachts. The western entrance has shoaled up, but a privately marked channel has been dredged from Rancocas Creek eastward of buoy 2 into the harbor. Depths are about 4 feet in the entrance channel

increasing up to 15 feet inside. The sand and gravel wharves on the northeast side of the harbor have depths of 8 to 10 feet at their outer ends. Fuel, supplies, slips, and repairs to small craft are available at the facilities at the south and east sides of the harbor.

**Rancocas Creek**, Mile 96S, has some sand and gravel barge traffic as far as the first bridge; above this point the creek is used only by pleasure boats. Depths are about 5 feet to **Centerton**, 6 miles above the mouth. The channel is narrow and crooked above Bridgeboro, and in general follows ebb-tide bends back and forth between shoals; navigation is difficult without local knowledge. The entrance to the creek is marked by a buoy. The current velocity is about 1 knot in the entrance. Gasoline can be obtained at the small-craft facilities near the first bridge and at Bridgeboro; some repairs can be made.

The highway bridge 1.3 miles above the mouth has a swing span with a clearance of 4 feet. The railroad bridge 0.2 mile above the highway bridge has a swing span with a width of 42 feet and a clearance of 3 feet; see **203.225**, chapter 2, for drawspan regulations.

The highway bridge at **Bridgeboro**, 2.6 miles above the mouth, has a bascule span with a clearance of 8 feet; just below this bridge is an overhead cable with a clearance of 160 feet. Centerton Bridge, 6 miles above the mouth, has a swing span with a width of 48 feet in the south opening and a clearance of 6 feet; see **203.225**, chapter 2, for drawspan regulations. Above this point navigation is limited by fixed bridges, the least clearance being 6 feet at the Mount Holly bridge, 11.5 miles above the mouth.

**Poquessing Creek**, Mile 97N, forms the upper boundary of the city of Philadelphia. The yacht club at **Torresdale**, a part of the city on the lower side of the creek, has a float landing where fuel and some supplies can be obtained; depths at the float are 10 to 14 feet.

**Mud Island**, just above Poquessing Creek, is a flat which is partly submerged at high water and is covered with marsh grass in the summer. The channel between Mud Island and the Pennsylvania mainland has a controlling depth of about 7 feet. The lower part of the channel is used considerably as a small-boat anchorage.

**Andalusia**, Mile 97.5N, is a suburban residential community with a few industries along the waterfront. A marina back of Mud Island has fuel, supplies, slips, and a 20-ton lift for hauling out small craft for repairs. The yacht club at **Cornwells Heights**, a mile eastward of Andalusia, has a float landing with about 10 feet alongside; fuel and water are available.

A 560-foot wharf of a gypsum plant extends 150 yards off the New Jersey side just west of **Beverly**, Mile 99S. In 1965 depths of 32 feet were being dredged alongside the wharf.

**Neshaminy Creek**, Mile 100N, has depths of about 7 feet to the fixed bridge 0.7 mile above the mouth, thence 3 feet to the fixed railroad bridge 1.2 miles above the mouth. The fixed highway bridge has a clearance of

9 feet. There are several boatyards and marinas along the creek. Fuel, supplies, and slips are available. Maximum haul-out capacities for repairs are: railway, 60 feet; lift, 35 tons.

The power cable over Delaware River at Mile 101.7 has a clearance of 140 feet. A highway bridge at Mile 102.1 has a vertical-lift span with clearances of 62 feet down and 134 feet up; see **203.227**, chapter 2, for drawspan regulations.

**Burlington**, Mile 102.5S, fronts in part on the main channel of Delaware River and part on the auxiliary channel southeast of Burlington Island. Several industries are located at Burlington and its suburb, **East Burlington**, which is centered a mile along the auxiliary channel. See appendix for **storm warning displays**.

The Delaware River main channel continues along the northwest side of Burlington Island, and the auxiliary channel with depths of about 14 feet extends along the southeast side for 1.2 miles to a turning basin at the upper end of the U.S. Pipe and Foundry Company. Eastward of the turning basin the back channel has natural depths of 12 feet for about 0.5 mile, but shoals to about 2 feet in the narrow northeast entrance.

The overhead power cable about 0.3 mile northeast of the turning basin has a clearance of 45 feet.

The current velocity is 1.4 knots in the main channel west of Burlington Island. In the back channel east of the island, the velocity is 0.9 knot on the flood and 1.8 knots on the ebb.

The public utilities wharf at the lower end of Burlington has depths of 25 feet at the face; other wharves have depths ranging from 7 to 12 feet. The foundry wharf at East Burlington has depths of about 20 feet at the face and the oil wharf above the turning basin has depths of about 12 feet at the outer face. A marina at the entrance to **Assiscunk Creek** has gasoline, some supplies, and slips. Repairs can be made; a 7-ton lift is available.

**Bristol**, Mile 103.5N, was the terminus of the **Delaware and Lehigh Canal**, which was abandoned in 1931; the former Bristol entrance from the river is filled in. The public wharf at the lower end of the town has depths of about 6 feet at the face. A yacht club near the upper end of Bristol has float landings with 14 feet alongside; gasoline and water are available; members or guests may use the club railway to haul out boats up to 38 feet in length, but must make their own repairs.

A 600-foot wharf of a steel plant is at Mile 104.4S; depths of 40 feet were being dredged alongside in 1965. The gypsum wharf just northeastward has 26 feet alongside its face.

The fixed highway bridge at Mile 105.1 has a clearance of 135 feet.

**Florence**, Mile 107W, is the site of a pipe foundry. The foundry wharf, at the lower end of the town, has depths of about 12 feet off the face.

**Roebing**, at Mile 108S, is a privately-owned port which

operates an extensive wire-cable plant. The main wharf has depths of about 12 feet at the face.

**Newbold Island**, just above the Roebing main wharf, is 1.5 miles long, with a greatest width of 0.7 mile. The main channel of Delaware River is along the north side of Newbold Island.

The back channel between the island and the New Jersey mainland has a controlling depth of about 9 feet from the upstream end of the island to the salvage yard 0.3 mile inside. West of the yard, the channel is impassable except for small boats at high water.

At Mile 109N is a basin where sand and gravel are handled. The wharves have depths of about 8 feet at their faces.

An unloading slip of the **Fairless Works, U.S. Steel Company**, Mile 109.4N, extends northward into the Pennsylvania shore opposite Newbold Island. The slip can accommodate the deepest draft navigating the river.

**Fieldsboro**, Mile 110.5S, is chiefly a residential community, but there are some industrial activities along the waterfront. A pier with mooring dolphins of a chemical plant extends 250 feet from shore at the lower end of town. In 1965 depths of 27 feet were being dredged between the pier and the main channel. The current velocity off Fieldsboro is 1.4 knots on the ebb; the flood current is weak and of short duration.

**Crosswicks Creek**, Mile 111.1S, is used extensively by pleasure craft. Gasoline can be obtained from one of the yacht clubs.

**Bordentown**, on the high bank on the southeast side of the entrance to Crosswicks Creek, was the terminus of the **Delaware and Raritan Canal**, which was abandoned in 1933.

On **Duck Island**, Mile 113E, there are oil-receiving piers with 8 feet alongside and a public utility coal pier with 20 feet or more alongside. Oil tankers stay in the main channel to abreast the coal pier before heading toward shore and southward to the oil terminals to avoid the shoal area between the main channel and the terminals.

Small-craft fuel, supplies, and slips are available along the New Jersey shore between Duck Island and Trenton. Boats up to 47 feet in length can be hauled out for repairs.

A power cable with a clearance of 160 feet crosses the Delaware River at Mile 114.

**Trenton**, the capital of New Jersey, is at the railroad bridge crossing the river at Mile 116. The railroad bridge is the head of powerboat navigation. The city is an important manufacturing center.

**Trenton Marine Terminal** is a mile below the railroad bridge. Depths of 25 feet are alongside the 1,200-foot terminal wharf. The terminal has dockside rail connections, 10-ton gantry cranes, modern unloading equipment, and large covered and uncovered storage areas.

Just below the railroad bridge there is an oil receiving wharf with depths of 10 to 15 feet alongside.

## 7. CHESAPEAKE AND DELAWARE CANAL

**Chart 570.**—The **Chesapeake and Delaware Canal** is a sea-level waterway that extends from Delaware River at Reedy Point, Delaware, to **Back River** at Chesapeake City, Maryland, thence down Back River to Elk River and Chesapeake Bay. The Reedy Point entrance is 51 miles above the Delaware Capes, 35.5 miles below Philadelphia, 62 miles from Baltimore, and 187.5 miles from the Virginia Capes. Miles in the following text are the distances along the canal from the middle of Delaware River. **Reedy Point**, at Mile 0.7 on the north side of the Delaware entrance, is jettied and is marked by a light; the jetty on the south side is similarly marked.

**Navigation regulations.**—The following regulations are from the Code of Federal Regulations, Title 33, Navigation and Navigable Waters:

**207.100 Inland waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal); use, administration, and navigation—(a) Applicability.** This section is applicable to that part of the Inland Waterway from Delaware River to Chesapeake Bay, Delaware and Maryland, between the Delaware River and Elk River, including the Chesapeake and Delaware Canal and the Delaware City Branch Channel which extends from the Delaware River at Delaware City to its junction with the Canal about 1.5 miles west of Reedy Point.

**(b) Supervision.** The District Engineer, Corps of Engineers, Philadelphia, Pennsylvania, has administrative supervision over the waterway and is charged with the enforcement of this section. The District Engineer from time to time will prescribe the dimensions of vessels which may transit the waterway, and the special conditions which shall govern the movements of vessels using the waterway. The District Engineer's representative is the Canal Superintendent. All orders in aiding and directing traffic and in enforcing this section will be issued by the Superintendent through the dispatcher and the patrolmen on duty.

**(c) Safe navigation required.** Permission for any vessel to enter or pass through any part of the waterway will be contingent on the vessel's being properly equipped in personnel, machinery, and operative devices for safe navigation. In the event of question as to the ability of any vessel to navigate the waterway in safety, a ruling thereon will be made by the dispatcher. An appeal from the dispatcher's ruling may be taken by the owner, agent, master, or other person in charge of the vessel concerned to the District Engineer whose decision shall be final. The granting of permission for any vessel to proceed

through the waterway shall not relieve the owners, agents, and operators of the vessel of full responsibility for its safe passage.

**(d) Anchorage, mooring, and wharfage facilities.**

5 The anchorage basin on the south side of the waterway at Chesapeake City, mooring basins and tie-up dolphins on the north side of the waterway at Reedy Point and in Back Creek about one mile west of Chesapeake City, and free wharfage facilities on the west side of the anchorage basin at Chesapeake City and on the north side of the Branch Channel at Delaware City, are of limited capacity, and permission to occupy them for periods exceeding 24 hours must be obtained in advance from the dispatcher at Chesapeake City. The mooring dolphins provided on each side of the vertical lift bridges shall be used for mooring in emergencies only. Any craft using these anchorage, mooring, and wharfage facilities must have on board at all times a crew adequate to care properly for the vessel, and the United States assumes no responsibility for damages which may be sustained while using such facilities.

25 **(e) Projections from vessels.** No vessel carrying a deck load which overhangs or projects beyond the sides of the vessel will be permitted to enter or pass through the waterway. Vessels carrying rods, poles, or other gear extending above the top of the vessel's mast will be required to lower such equipment to a level with the top of the mast before entering the waterway.

30 **(f) Speed.** No vessel in the waterway or approaches shall be raced or crowded alongside another vessel, or be moved at such speed as will cause excessive swells or wash. Speed shall be kept at a minimum consistent with safe navigation. All vessels, when passing other vessels, mooring dolphins, wharves, landings, dredging plant, or other working craft, shall proceed with caution to avoid wave or suction damage. When approaching any bridge the speed of vessels shall be so regulated that they will be under full control and, in the event the span cannot be raised immediately, be able to stop and tie up at the emergency dolphins.

40 **(g) Tows.** All ships or tugs engaged in towing vessels not equipped with a rudder, whether light or loaded, shall use two towlines or a bridle on one towline. If the vessel in tow is equipped with a rudder one towline without a bridle may be used. All towlines must be hauled as short as practicable for safe handling of the tows. No towboat will be permitted to enter the waterway with more than two loaded, or three light, barges. Two or more barges or other vessels, not self-propelled, shall be towed abreast and not in tandem, using two towlines

unless the towboat is made fast alongside the tow. Such tows shall have a combined beam of not more than 105 feet, including the towboat if made fast alongside.

(h) **Right of way.** All vessels proceeding with the current shall have the right of way over those proceeding against the current. Vessels up to 150 feet in length shall be operated so as not to interfere with the operation of vessels of greater length at bridges and bends. Large vessels or tows must not overtake and attempt to pass other large vessels or tows in the waterway.

(i) **Traffic lights.** (1) Navigation in and through the waterway shall be governed by the following system of traffic control lights. These lights, which are of fixed type, are located on the outer end of the north jetty at the eastern entrance to the waterway, at Summit Bridge approximately 1.5 miles west of the Pennsylvania Railroad bridge, on the Chesapeake City bridge, Chesapeake City, Md., and at Old Town Point wharf, Maryland.

(i) **Green light.** Waterway open to navigation. Vessel may proceed.

(ii) **Amber light.** Caution. Traffic restricted.

(iii) **Red light.** Waterway closed to traffic. Vessel must stop.

(2) In addition to the above system of lights, navigation shall be governed by the lights installed at the drawbridges crossing the waterway as described in paragraph (j) of this section.

(j) **Drawbridges—(1) Signals.** When at any time during the day or night any vessel, tug, or other watercraft unable to pass under a closed drawbridge, approaches it with the intention of passing through the draw, the signal for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel or craft. If the drawspan is to be opened immediately when the signal is given on the vessel or craft, the bridgetender will reply with one blast of a whistle or horn indicating he is preparing to open the bridge. If at any time after signal from the vessel the drawbridge is not ready to be opened, the bridgetender will immediately sound four blasts of a whistle or horn. When the bridge is open and clear for vessel passage, the bridgetender will sound two blasts of a whistle or horn.

(2) **Lights.** The foregoing whistle or horn signals by the bridgetender will be supplemented by the following lights in the center of the drawspan, on both the upstream and downstream sides of the bridge:

(i) **Supplementary bridge operating lights—(a) Fixed amber light.** Bridge being prepared for opening.

(b) **Flashing red light.** Bridge opening to be delayed.

(ii) **Fixed navigation lights required by the Coast Guard—(a) Fixed red light.** Bridge closed to navigation. Vessel unable to pass under closed drawspan must be kept under control so it can be stopped if necessary.

(b) **Fixed green light.** Bridge open to navigation. Vessel may proceed.

(iii) The fixed navigation lights referred to in subdivision (ii) of this subparagraph are those prescribed by the Coast Guard under Part 68 of this title. The supplementary

bridge operating lights referred to in subdivision (i) of this subparagraph shall be of such visibility and placed at such locations as are satisfactory to the Coast Guard, so as not to conflict with the locations and intended purpose of the fixed lights. Supplementary bridge lighting is not required at the drawbridge across Branch Channel at Delaware City, Del.

(3) [Reserved].

(4) The drawbridge crossing Branch Channel at Delaware City will be opened for the passage of vessels only between 8:00 a.m. and 4:00 p.m. Whenever a vessel, unable to pass under the closed bridge, desires to pass through the draw, at least two hours' advance notice of the time the opening is required shall be given to the dispatcher at Chesapeake City, Maryland.

(k) **Stopping in waterway.** Whenever a vessel stops in the land cut elsewhere than at the mooring dolphins, it shall be fastened securely to one bank and only at such place and under such conditions as will not obstruct the passage of other vessels or craft. When thus tied up all vessels must be moored by not less than two lines each, and no vessel shall be tied up abreast of another. Sufficient crew to care properly for such vessels shall remain on board at all times. Vessels that have been tied up or anchored in or at the entrance to the waterway shall not proceed until given clearance by the dispatcher. Stoppages in the improved portions of the waterway shall be only for such periods as may be necessary, and no vessel or craft will be allowed to use such portions of the waterway as a permanent or semipermanent place of mooring without the permission of the District Engineer. Vessels may anchor in Elk River, but they shall not anchor in the channel, and during the night they shall display lights as required by the Federal Pilot Rules.

(l) **Refuse.** The placing of any ashes, refuse, or other material likely to cause an obstruction in the waterway or upon the banks or rights of way thereof is prohibited.

(m) **Trespass upon or injury to waterway property.** Trespass upon the waterway property or injury to the waterway, lands, banks, bridges, jetties, piers, fences, houses, trees, telephone lines, or any other property of the United States pertaining to the waterway is prohibited.

(n) **Fish and game.** The fish and game laws of the United States and of the States of Delaware and Maryland, within their respective bounds, will be enforced upon the waters and lands pertaining to the waterway owned by the United States. The use of traps and nets upon the property is forbidden except on written permission from the District Engineer.

(o) **Grounded, wrecked, or damaged vessels.** In the event a vessel is grounded or wrecked in the waterway or is so damaged by accident as to render it likely to become an obstruction in the waterway, the District Engineer shall supervise and direct all operations that may be necessary to float the vessel, clear the wreckage, or move the damaged vessel to a safe locality.

(p) **Commercial statistics.** Masters or pursers of vessels shall furnish the District Engineer or his authorized

representative, on each passage through the waterway, such written statement of passengers, freight, and vessel data as may be indicated by blank forms furnished for this purpose. Failure to furnish this statement will result in denial to the offending vessel of the privilege of using the waterway. Blank forms may be obtained from the following:

(1) U.S. Army Engineer District, PHILADELPHIA, Custom House, 2d and Chestnut Street, Philadelphia, Pennsylvania.

(2) U.S. Army Engineer District, BALTIMORE, 24th and Maryland Avenue, Baltimore, Maryland.

(3) Resident Engineer, Chesapeake City Suboffice, Philadelphia District, Corps of Engineers, Chesapeake City, Maryland.

(4) Patrol boats in the waterway.

(5) Pilots.

**Local regulations.**—The following general instructions governing traffic in the canal were issued by the Philadelphia District Engineer on June 18, 1959, to supplement the rules and regulations in **207.100**, governing the use, administration, and navigation of the waterway.

1. Ships and large tows intending to transit the canal shall not enter the canal until they have been given clearance by the patrol boat stationed at the entrance.

2. Vessels of 25-foot draft or less may transit the canal at any time under the following conditions:

(a) The maximum overall length of vessels which may transit the canal is limited to 650 feet during daylight hours and to 600 feet during darkness and periods of poor visibility.

(b) Vessels under 275 feet overall length may transit the canal without prior arrangements.

(c) Vessels 275 feet overall length and over must make prior arrangements with the Canal Dispatcher for specific trips.

(d) Vessels 375 feet overall length or over will not pass each other in the canal between Reedy Point and the tieup dolphins west of Chesapeake City.

(e) No vessel having a greater draft forward than aft will be allowed to enter the canal.

(f) Dead vessels and all vessels observed by the pilot in charge to be difficult to handle or known to have handled badly on previous trips must transit the canal during daylight hours and must have tug assistance. Such vessels must obtain permission from the Dispatcher to enter the canal and must be provided with the number of tugs sufficient to afford safe passage. Agents must make their own arrangements for tug assistance. Such eastbound vessels must clear Reedy Point Bridge and such westbound vessels the Chesapeake City Bridge before dark.

3. The maximum length of pontoon rafts using the canal will be limited to 600 feet, and the maximum width to 100 feet. Pontoon rafts exceeding 200 feet in length will be required to have an additional tug on the stern to insure that the tow is kept in line. The tugs used must have sufficient power to handle the raft safely.

4. The granting of permission for any vessel to proceed through the canal, either by day or night, with or without tug assistance, shall not relieve the owner, agents or operators of the vessel of full responsibility for its safe passage.

5. Vessels requiring a pilot under existing State laws or Coast Guard regulations may be handled through the canal by any pilot duly licensed for this waterway by the Office of Marine Inspection, U.S. Coast Guard and approved for the District Engineer by the Canal Superintendent. Pilots will be approved upon satisfactory completion of at least three trips through the canal during the preceding 12 months.

6. The Master of every vessel 200 feet overall length and over shall report to the Dispatcher the name of the pilot handling the vessel through the canal.

7. The patrol boats stationed at the ends of the canal are used for traffic control, the collection of commercial statistics, and for the identification of vessels transiting the canal. Masters or pursers of commercial vessels shall furnish, on each passage through the waterway, written statement of passengers, freight and vessel data in accordance with the provisions of the regulations. Although pleasure craft are not generally required to give any information to the patrol boats, such craft shall, upon their first passages through the canal or when they are not recognized, furnish such information as may be requested by the patrol boats.

8. Vessels of all types, including pleasure craft, are required to travel at all times at a safe speed throughout the canal and its approaches so as to avoid damage by suction or wave wash to wharves, landings, or other boats, or injury to persons. All pilots transiting the canal and its approaches are warned that violation of this rule may result in their suspension for 30 days as canal pilots, and flagrant or repeated offenses will be followed by their citation to the Coast Guard for reckless navigation. Passages of all vessels through the canal will be recorded and determination will be made of those vessels which appear to travel at excessive speeds, without waiting for investigation of specific cases where damage by suction or wave wash does occur.

9. Owners of yachts, motorboats, rowboats and other craft moored or anchored in the canal or its approaches are cautioned to secure their vessels in such manner as will avoid damage from the passages of ships at reasonable speed.

10. Water skiing in the canal is prohibited between the Delaware River and Welch Point, Maryland.

11. The lights along the northerly bank of the canal between Reedy Point and Chesapeake City have been provided to promote safe navigation through the canal at night. All vessels should keep clear of the poles and power lines supplying those lights.

**Channels.**—The Federal project for the canal provides for a channel 35 feet deep and 450 feet wide. In 1966 work was underway to provide these dimensions by dredging and straightening some of the bends. As it will take

several years to complete the project, extreme caution will continue to be necessary when transiting the canal. Dredging equipment may be located along the waterway and the marine lights may be discontinued or replaced by buoys.

The controlling depth through the canal was about 25 feet in 1965; the least width of the channel is 250 feet.

In addition to the navigational aids, the north bank of the canal between Mile 1.5 and Mile 12.6 is lighted at night by mercury vapor lights 500 feet apart to illuminate the bank at the water's edge to assist ships navigating the canal. The south bank is also lighted for about 3.2 miles westward of the St. Georges bridge.

The **Delaware City Branch Channel** extends northward from the canal at Mile 2.5 for 1.5 miles to Delaware River at Delaware City; the controlling depth is about 3 feet. Delaware City has been described in chapter 6.

**Anchorage.**—An anchorage basin is provided on the south side of the canal at Mile 12.8 opposite Chesapeake City; the controlling depth is about 4 to 10 feet in the entrance and 14 feet inside the basin. Free wharfage is available at the Government wharf on the west side of the basin.

**Mooring basins** are provided on the north side of the canal west of Reedy Point at Mile 1.4, and west of Chesapeake City at the east end of Back Creek, Mile 13.6; each basin is 1,700 feet long and is provided with tie-up dolphins spaced 50 feet on centers. Controlling depths are about 14 feet in the Reedy Point basin and 30 feet in the Back Creek basin.

Regulations for the use of the anchorage and mooring basins are given in 207.100, referred to previously in this chapter.

A special **small-vessel anchorage**, with depths of 3 to 4 feet, is on the southeast side of the canal at Mile 16.3, northeastward of Courthouse Point; see 202.1 and 202.70, chapter 2, for limits and regulations.

**Bridges.**—The canal is crossed by two vertical-lift bridges and three high-level fixed bridges. The Reedy Point highway bridge at Mile 1.7 has a vertical-lift span with clearances of 6 feet down and 135 feet up. The fixed highway bridge at **St. Georges**, Mile 5.0, has a clearance of 135 feet.

The **Pennsylvania Railroad Bridge** across the cut at **Canal Station**, Mile 7.5, has a vertical-lift span with clearances of 45 feet down and 133 feet up. The overhead pipeline a mile west of the bridge at Mile 8.5 has a clearance of 135 feet.

The **fixed highway bridge** just west of the town of **Summit Bridge** at Mile 9.2 has a clearance of 135 feet for the southerly 230 feet of the 250-foot channel. Overhead power cables between this bridge and Chesapeake City have minimum clearance of 142 feet.

The **fixed highway bridge** at **Chesapeake City**, Mile 13.0, has a clearance of 135 feet.

The **highway bridge** over **Delaware City Branch Channel** a mile northward of the canal has a bascule span

with a clearance of 6 feet. The overhead telephone cable extending along the southwest side of the bridge has a clearance of 30 feet; an overhead power cable 500 feet north of the bridge has a clearance of 64 feet.

Operation regulations for the bridges with drawspans are given in 207.100, referred to previously in this chapter.

**Tides.**—The normal range of tide is 5.5 feet at the Delaware River end of the canal and 2.6 feet at Chesapeake City. High and low waters in Delaware River are about 2 hours later than in Elk River. The heights of high and low waters are greatly affected by the winds; northeast storms raise the level and westerly storms lower it. See the Tide Tables for daily predictions for Reedy Point.

**Staff gages**, with zeroes set at **canal datum**, are at numerous places along the canal, including the bridges and both ends. The datum is 2 feet below local mean low water at the mouth of Back Creek and about ½ foot below at Delaware River.

**Currents.**—The current velocity is 2.6 knots on the flood and 2.1 knots on the ebb at the Reedy Point bridge, and about 2 knots at the Chesapeake City bridge; see the Tidal Current Tables for daily predictions for Chesapeake City. Storms may increase these velocities to 3.0 knots or more; at such times, tows usually have difficulty in making headway against the current.

See appendix for **storm warning displays**.

**Ice** sufficient to interfere with the navigation of small craft may be expected at any time between December and April and is worst during January and February. The canal is kept open as long as possible. During mild winters, local vessels use the canal throughout most of the season, but strangers should make inquiries before attempting passage. Wooden vessels passing through thin ice are liable to be cut through at the waterline. Vessels with low horsepower are cautioned against transiting the canal in heavy ice.

**Pilotage** through the canal from Delaware River to Chesapeake City is provided by the Delaware Bay and River pilots; see chapter 6. Pilotage from Chesapeake City to points along Chesapeake Bay is provided by the Maryland pilots; see chapter 15.

**Supplies and repairs.**—Small vessels can obtain fuel and supplies at Chesapeake City. The principal wharves have depths of 7 to 20 feet at their faces.

The largest marine railway in the area is on the north side of the canal at Mile 13.4, 0.5 mile west of the Chesapeake City bridge. The railway can handle vessels up to 110 feet in length for repairs.

At Mile 16.2, 0.4 mile eastward of **Courthouse Point**, a marked channel with a depth of about 5 feet leads to a marina where fuel, supplies, repair, and berthing facilities are available; largest lift, 12 tons. A boatyard on Courthouse Point has a 6-ton lift and does minor repairs; gasoline is available.

For discussion of Elk River and the upper part of Chesapeake Bay, see chapter 15.

## 8. DELAWARE-MARYLAND-VIRGINIA COAST

**Charts 1219 to 1222.**—The coast extends southward for 21 miles from Cape Henlopen to the Delaware-Maryland boundary line, thence south-southwestward for 27 miles to the Maryland-Virginia boundary, and thence 63 miles to Cape Charles. The low sand beaches are backed by bays, rivers, and creeks which are bordered by marsh and woodland. Broken ground fringes the coast, and depths of 36 feet or less are found as far as 12 miles from shore.

Visible from seaward are the summer resorts of Rehoboth Beach, Bethany Beach, and Ocean City, all within 30 miles of Cape Henlopen. The most prominent marks south of Ocean City are the light structures and the Coast Guard stations.

The bays and connecting channels back of the barrier beaches form a continuous inside passage from Delaware Bay to Chesapeake Bay, but Assawoman Canal and Little Assawoman Bay are now navigable only for rowboats and outboards.

There are no harbors of refuge for deep-draft vessels along this coast. The inlets are subject to frequent change and their navigation requires local knowledge.

**Fishtraps** along the coast from Cape Henlopen to Cape Charles are limited by Federal regulations to certain areas which are shown on the charts. Numerous pile remains of former traps are said to menace inshore navigation.

**Navigational aids.**—Most of the navigable inlets are marked by buoys, but the channels shift and the buoys cannot always be depended upon to mark the best water. Breakers form on the shoals even in ordinary weather and are good marks. Some of the interior channels are marked by daybeacons and lights, but others are marked only by bush stakes. The channels through the flats can be followed best at low water when the flats are visible.

**Tides.**—The mean range of tide varies from 3.5 to 4.4 feet along the coast; high and low waters occur at about the same time as at Sandy Hook. Levels in the inside waters are greatly affected by winds, westerly winds producing low water and easterly winds high water. In Assawoman, Isle of Wight, Sinepuxent, and Chincoteague Bays, northerly and southerly winds drive the water to the ends of the bays. With strong winds of long duration, depths may be as much as 3 feet above or below the normal level.

**Currents.**—The currents have considerable velocity in the inlets and in the narrow channels connecting the inlets with adjacent bays and sounds. Velocities of as much as 3 knots may be encountered at times in places where the currents are strongest.

**Ice.**—The inside waters north of Chincoteague Bay occasionally are closed by ice during ordinary winters. The tributary waters south of the bay are closed during severe winters but remain so only for short periods. The principal inlets are rarely closed and are used by local boats throughout the winter.

**Chart 411.**—**Cape Henlopen**, on the southwest side of the entrance to Delaware Bay, is described in chapter 6.

**Roosevelt Inlet**, 3 miles west of Cape Henlopen, is the Delaware Bay entrance to the Lewes and Rehoboth Canal and to Broadkill River. The inlet is protected by jetties, each marked by a light on its outer end; a fog signal operates at the southeast light, and a lighted range marks the centerline of the entrance channel. The mean range of tide is 4.4 feet in Roosevelt Inlet; the current velocity is about 0.9 knot. In 1965 the controlling depth was 10 feet between the jetties. A Coast Guard unit is on the northwest side of the inlet and fuel can be obtained at a wharf on the southeast side.

**Broadkill River** is entered by way of an inside passage that extends northwestward for 2 miles from the Roosevelt Inlet jetties to the old mouth of the river; thence the river extends 9 miles westward to the town of Milton. The controlling depths are about 6 feet from the junction with Roosevelt Inlet for 2 miles upstream, and thence 2 feet to Milton.

The highway bridge over Broadkill River 7 miles from the jetties has a 43-foot bascule span with a clearance of 3 feet; the overhead power cable at the bridge has a clearance of 64 feet. Above the bridge the river has numerous snags and there is much floating debris.

The **Lewes and Rehoboth Canal** is a tidal waterway that extends southeastward and southward for 8 miles from Roosevelt Inlet to Rehoboth Bay. The canal passes northeastward of Lewes and westward of Rehoboth Beach; the entrance to Rehoboth Bay is between stone jetties a mile southwest of Dewey Beach. The mean range of tide in the canal is 3.6 feet at Lewes and 0.5 foot at Rehoboth Beach. The controlling depths are about 10 feet to the turning basin at Lewes, thence 6 feet to Rehoboth Bay. The posted speed limit is 4 miles per hour in the canal.

**Lewes**, 1.7 miles inside Roosevelt Inlet, has rail connections and is the southern terminal for the Cape May-Lewes Ferry. The Public Health Service maintains an outpatient office in the town.

Fuel, supplies, repairs, and slips are available at Lewes west of the first bridge; largest marine railway, 65 feet.

The highway bridge over the canal at Lewes has a 46-foot bascule span with a clearance of 6 feet. The railroad bridge 0.2 mile southeastward of the highway bridge has a 46-foot swing span with a clearance of 10 feet; the span remains in the open position except for the infrequent passage of trains; the overhead cable at the bridge has a clearance of 68 feet. A fixed highway bridge with a clearance of 35 feet is 100 yards southeastward of the railroad bridge.

Slips and gasoline are available at a basin on the east side of the canal 4 miles southeastward of Lewes. A marine railway can haul out boats up to 50 feet in length for repairs.

The highway bridge over the canal at **Rehoboth Beach**, 6.5 miles from Roosevelt Inlet, has a 49-foot bascule span with a clearance of 16 feet; the overhead power cable on the north side of the bridge has a clearance of 80 feet. The highway bridge 0.3 mile farther southward has a bascule span with a clearance of 14 feet; the overhead power cable on the south side of the bridge has a clearance of 80 feet. Drawnspan regulations for these bridges are given in **203.237b**, chapter 2.

**Rehoboth Bay** has depths of 3 to 7 feet. The 5-mile route down Rehoboth Bay from the Lewes and Rehoboth Canal to Indian River Bay is marked by lights and daybeacons. The controlling depth through the marked bay channel is about 5 feet, but depths of 3 feet and less are in the channel between the islands separating the two bays. Gasoline, some supplies, and slips are available at the northeast end of Rehoboth Bay at **Dewey Beach**.

**Love Creek**, at the northwest corner of Rehoboth Bay, is navigable for small craft to a milldam near **Robinsonville**, 4 miles above the mouth. The fixed highway bridge 2.3 miles above the mouth has an 18-foot channel span with a clearance of 7 feet. Above the bridge are berthing facilities in depths of 1 to 2 feet. The controlling depth is about 2½ feet from Rehoboth Bay to the bridge.

**Herring Creek**, at the southwest corner of Rehoboth Bay, has depths of 3 to 5 feet to the forks 2 miles above the mouth, thence 1 to 3 feet for 0.5 mile up the northern prong and 5 feet for a mile up the southern prong. The creek is used except by local residents.

**Indian River Inlet**, the south of Cape Henlopen, is the first opening in the barrier beach south of Delaware Bay. The entrance is marked by buoys; lights are on the jetties and a marker radiobeacon is on the north side of the entrance. A Coast Guard station is on the north side 0.5 mile inside the inlet. See appendix for **storm warning displays**.

A channel leads from Indian River Inlet through Indian River Bay and up Indian River to Millsboro, 12 miles above the inlet. The controlling depths are about 10 feet through the entrance jetties to the fixed bridge, thence 4 feet to Millsboro, except for shoaling in the channel between the light west of **Burton Island** and daybeacon 20. Buoys mark the shifting channel between the en-

trance and the junction light, and daybeacons mark the channel to Millsboro.

The mean range of tide is 3.9 feet at the ocean end of Indian River Inlet and 2.6 feet at the highway bridge over the inlet. The current velocity is about 2 knots; caution is necessary because the buoys sometimes tow under.

The fixed highway bridge over Indian River Inlet has a clearance of 32 feet; the stub ends of the former drawbridge remain, leaving a clear channel of 270 feet. The overhead power cable west of the bridge has a clearance of 105 feet; the supporting towers on both sides of the inlet are prominent.

Fuel, supplies, and slips are available at a basin on the north side, 0.8 mile inside Indian River Inlet. Repairs can be made; lift, 10 tons.

A special small-vessel **anchorage area** is on the south side of Indian River Inlet 1.2 miles above the jetties; see **202.1** and **202.65**, Chapter 2, for limits and regulations.

**Indian River Bay**, a shallow lagoon with depths of 1 to 6 feet, extends for about 5 miles west of Indian River Inlet, then becomes **Indian River** which is navigable for an additional 7 miles to Millsboro. The 5-mile route down the bay from Rehoboth Bay to Assawoman Canal is marked by daybeacons; the controlling depth is about 2 feet.

**Pepper Creek**, on the south side of Indian River Bay near its western end, has a 6-foot channel marked by daybeacons extending for 3 miles above the entrance. A clam plant is at the upper end of the creek. Gasoline and slips are available 2 miles above the entrance; repairs can be made; marine railway, 60 feet.

Most of the piers and facilities on the north side of Indian River are private.

**Millsboro**, on the south side of Indian River at the head of navigation, has a town bulkhead; gasoline and some supplies are available. About 100 yards below the causeway at Millsboro there is an overhead power cable with a clearance of 43 feet. The town has railroad freight service.

**White Creek** is on the south side of Indian River Bay 1.5 miles back of the outer beach. A 2-foot channel marked by daybeacons passes through the bay and creek to Assawoman Canal and **Ocean View** where gasoline and some supplies are available.

**Chart 1219.—Assawoman Canal**, a 3-mile land cut that connects White Creek with the north end of Little Assawoman Bay, has a controlling depth of about 2½ feet. Three fixed highway bridges over the canal have a minimum width of 14 feet and clearance of 4 feet. The power cable over the canal has a clearance of 36 feet.

The **danger zone** of an antiaircraft artillery firing area extends about 6 miles offshore from a point about 6 miles south of Indian River Inlet; see **204.25**, chapter 2, for limits and regulations.

**Little Assawoman Bay**, behind the barrier beach of **Fenwick Island**, is 3 miles long and extends southward

almost to Fenwick Island Light. The bay has depths of 2 to 4 feet in some places but is bare in others and is seldom used. The only route markings are random stakes set by local residents.

**Chart 1220.—Fenwick Island Light** ( $38^{\circ}27.1' \text{ N.}$ ,  $75^{\circ}03.3' \text{ W.}$ ), 83 feet above the water, is shown from an 87-foot white tower, about 0.3 mile back of the beach. The tower, just north of the Delaware-Maryland boundary line, is 9 miles south of Indian River Inlet and 21 miles south of Cape Henlopen.

**Fenwick Shoal**, 6 miles eastward of Fenwick Island Light, has a least depth of 14 feet, but the westerly of two wrecks near the crest of the shoal is covered only 6 feet. A lighted whistle buoy marks the southwest end of the shoal and another is moored 8 miles east by south of the shoal. Deep-draft vessels normally pass to eastward of the outer buoy.

**Isle of Wight Shoal**, 7 miles southeastward of Fenwick Island Light, has a depth of 21 feet and is marked on its west side by a buoy. A 24-foot shoal is about midway between Isle of Wight Shoal and Fenwick Shoal.

A narrow thorofare, 0.4 mile west of Fenwick Island Light, links Little Assawoman Bay with Assawoman Bay; the controlling depth is about 2 feet. It is navigable by small boats with local knowledge. The fixed highway bridge near the north end of the thorofare has a width of 37 feet and a clearance of 11 feet.

**Assawoman Bay and Isle of Wight Bay** form a continuous lagoon that extends from the vicinity of Fenwick Island Light to Ocean City. The bays have depths of 4 to 6 feet along their western sides, and are frequented by boats from Ocean City.

**Ocean City Inlet**, between Fenwick Island and Assateague Island, is 29 miles south of Cape Henlopen and is the only break in the barrier beach between Indian River Inlet and Chincoteague Inlet. The entrance is between stone jetties, but the north jetty and the outer end of the south jetty are covered at high water. A 0.1-mile long fishing pier is 0.2 mile north of the north jetty. A Coast Guard station is 0.6 mile inside the inlet on the southwest side of Ocean City; see appendix for storm warning displays.

**Little Gull Bank**, 3 miles southeastward of Ocean City Inlet, has a depth of 15 feet and is marked at its southwest end by a buoy. **Great Gull Bank**, 5 miles southeastward of the inlet, has a depth of 17 feet at its southwest end and is marked at its northern end by a lighted whistle buoy.

**Ocean City**, that part of Fenwick Island barrier beach in Maryland, is a large summer resort visited by many small boats in season, and is a shipping point for a large amount of seafood and produce.

The controlling depths are 10 to 15 feet in Ocean City Inlet, thence about 10 feet in the channel to Commercial Fish Harbor. The channel along the inner side of Ocean City has a controlling depth of about 7 feet to North

Eighth Street, 0.5 mile above the highway bridge, then almost bares before reaching deeper water in Isle of Wight Bay.

The entrance to Ocean City Inlet is marked by a fog signal and radiobeacon near the outer end of the north jetty, a light atop the lookout tower inshore, and lighted buoys that are shifted in position with changing channel conditions. Lights and daybeacons mark the channel to Isle of Wight Bay. The mean range of tide is 3.4 feet.

The highway bridge over Isle of Wight Bay from the mainland to Ocean City, 0.9 mile above the entrance jetties, has a bascule span with a clearance of 18 feet. Pile remains of an abandoned highway bridge are 0.2 mile south of the bridge.

There are numerous privately owned pile and timber piers and bulkhead wharves on the inner side of Ocean City. The **Commercial Fish Harbor**, on the mainland side a mile directly back of the inlet, has a 1,000-foot public bulkhead landing and several private bulkhead wharves open to the public for transaction of business with the owners.

Fuel and supplies are available at Ocean City. There are several marinas with transient slips. The largest repair yard is in Commercial Fish Harbor; a marine railway can handle boats up to 65 feet in length.

Busses operate to and from Ocean City. The Baltimore and Eastern Railroad has a freight siding at the Commercial Fish Harbor.

**Sinepuxent Bay**, narrow and mostly shoal, and **Chincoteague Bay**, with depths of 4 to 7 feet along its western side but shoal along its eastern side, are behind **Assateague Island** and provide a 30-mile inside route for small boats from Ocean City to Chincoteague. The bays are used by fishing and pleasure boats. The Maryland-Virginia boundary line is marked by orange-bordered daymarks on piles.

A dredged channel marked by lights and daybeacons extends 12 miles through Sinepuxent Bay to open water in Chincoteague Bay where the route to Chincoteague follows lights marking the shoal areas. The controlling depth is about 4 feet between Ocean City and Chincoteague; however, the Sinepuxent Bay channel is shoaled for a short distance. The canal passing shoaling and lesser depths may westward of Bay Bridge.

The fixed bridge across Sinepuxent Bay has a clearance of 38 feet; the overhead cables have a least clearance of 52 feet.

**Snow Hill Landing**, on the mainland side of Chincoteague Bay 15 miles from Ocean City Inlet, has a public wharf, private landings, and fish docks; all have depths of 4 feet alongside. A highway leads westward from the landing to **Snow Hill** on Pocomoke River. A small-boat basin with depths of 3 feet and a launching ramp is entered just north of the piers; gasoline is available.

A marina at the entrance to **Tanhouse Creek**, a mile south of Snow Hill Landing, has gasoline and an 8-ton lift.

**Greenbackville**, a village on the mainland side of Chincoteague Bay just south of the Maryland-Virginia boundary line and 4 miles north of Chincoteague, has a substantial trade in shellfish. The channel into the harbor, marked by lights, had a controlling depth of about 3 feet in 1965. The mean range of tide is 0.6 foot. A boatyard in the harbor can haul out boats up to 45 feet in length for repairs; gasoline and groceries are available.

The narrow channel marked by lights and daybeacons, east of **Killick Shoal**, is usually used to reach Chincoteague from Chincoteague Bay. The other passages between Chincoteague Bay and Chincoteague Inlet through marshy islands west of Chincoteague Island are used only by small boats with local knowledge. Controlling depths through these passages range from 1 to 6 feet and the fixed bridges over them have clearances of 4 to 12 feet.

**Assateague Light** ( $37^{\circ}54.7' N.$ ,  $75^{\circ}21.4' W.$ ), 154 feet above the water, is shown from a 142-foot red conical tower 3 miles from the south end of Assateague Island. The light stands well above the surrounding trees.

**Winter Quarter Shoal**, 11 miles east-northeast of Assateague Light, has depths of 10 to 17 feet, but a wreck just west of the highest part is covered only 5 feet; a buoy is on the west side of the wreck; another buoy is east of the shoal area.

**Blackfish Bank**, about 6 miles eastward of the south end of Assateague Island, has several depths of 13 to 16 feet along its 5-mile length, and near its southwest end is a depth of 11 feet over a wreck. A bell buoy is 0.6 mile south of the wreck. A 25-foot shoal 2.5 miles east of the wreck is marked on its east side by a lighted whistle buoy. Coasting vessels seeking protection from westerly weather pass westward of Blackfish Bank.

**Chincoteague Shoals**, extending about 3 miles east and south of the lower end of Assateague Island, have depths of 5 to 18 feet. An unlighted buoy and a lighted bell buoy are near the 5-fathom curve southerly of the shoals.

**Chincoteague Inlet**, between Assateague Island and Wallops Island, is 30 miles south-southwestward from Ocean City Inlet. The entrance channel is marked by buoys that are shifted in position with changing conditions; lights also mark the inner channel through the narrow passage eastward of **Chincoteague Point** and **Chincoteague Channel**. The controlling depth to Chincoteague is about 6 feet.

Assateague Light, Assateague Beach Light, and the red lights on the tall television tower a mile southward of Chincoteague, are good marks for approaching Chincoteague Inlet.

**Fishing Point**, the hook-shaped sandspit forming the south side of **Toms (Assateague) Cove**, is continually making out to the westward, requiring caution when in the vicinity.

**Chincoteague**, occupying most of **Chincoteague Island**, is between the mainland and the south end of Assateague Island. The highway bridge to Chincoteague has a swing span with a clearance of 16 feet over the main channel.

The town is principally a shellfish and fishing center, but pleasure craft operate from here during the summer. The wharves along the waterfront have depths of 3 to 10 feet alongside. Fuel and supplies are available; a marina south of the bridge has transient slips. Marine railways can haul out vessels up to 65 feet in length for repairs.

**Chart 1221.**—The 35-mile stretch of coast between Chincoteague Inlet and Great Machipongo Inlet is formed by six islands of about equal length. The islands are separated from each other by narrow inlets and from the mainland by marsh and flats through which are numerous sloughs and channels.

**Wallops Island**, northernmost of the six, is on the southwest side of Chincoteague Inlet.

**Assawoman Inlet**, the ocean entrance between **Wallops Island** and **Assawoman Island**, is very shallow and is not used. **Gargathy Inlet**, the ocean inlet separating **Assawoman Island** and **Metomkin Island**, is not used.

**Metomkin Inlet**, the ocean entrance between **Metomkin Island** and **Cedar Island**, is used by some small local fishing and oyster boats. The changeable entrance channel is marked, but it should not be entered without local knowledge.

**Porpoise Banks**, 10 miles offshore from **Metomkin Inlet**, have irregular bottom with depths of 34 to 40 feet.

**Wachapreague Inlet**, between **Cedar Island** and **Parramore Island**, is 20 miles south-southwestward of Chincoteague Inlet. The entrance is marked by a lighted bell buoy and unlighted buoys that are shifted in position with changing channel conditions. The controlling depth is about 5 feet through the inlet which is used by many fishing boats and by some boats seeking shelter, but should be entered only with local knowledge. The best anchorage is in **Horseshoe Lead**, southwest of the entrance, where there are depths of 20 to 30 feet west of the middle ground. **Parramore Beach Coast Guard Station** is on the inner side of **Parramore Island** 0.5 mile south of the inlet.

**Parramore Banks** extend about 8 miles offshore from **Wachapreague Inlet**. The area is lumpy and has numerous depths of 18 to 30 feet. A lighted whistle buoy is east of the banks.

**Wachapreague**, a town on the mainland about 4 miles west-northwest of **Wachapreague Inlet**, is an oystering and fishing center, and is a base for some pleasure boats during the summer. A depth of about 4 feet can be carried from **Wachapreague Inlet** through **Hummock Channel** and **Wachapreague Channel**, marked by lights, to the wharves at the town; there is also a marina. Fuel and some supplies are available. Marine railways can haul out boats up to 45 feet in length for repairs.

**Little Machipongo Inlet**, the ocean entrance between **Parramore Island** and **Hog Island**, has a fan of breakers across the entrance. The inlet is marked but should not be used without local knowledge. The controlling depth is about  $2\frac{1}{2}$  feet over the bar.

**Quinby** is a village on the mainland about 6 miles northwest of **Little Machipongo Inlet**. A channel to the village

marked by lights follows **Sandy Island Channel** to **Upshur Bay**, thence through a slough in the mudflats to a dredged channel leading to a basin that has a public terminal and landing; gasoline and some supplies are available. The controlling depth is about 6 feet.

**Great Machipongo Inlet**, the ocean entrance between **Hog Island** and **Cobb Island**, has breakers that form on the shoals on either side of the entrance at all times, but on the bar only in heavy weather. The inlet is marked by buoys that are shifted in position with changing channel conditions. The controlling depth is about 12 feet over the bar.

**Great Machipongo Channel** extends northwestward through **Hog Island Bay** from the inlet to the mainland where it continues as **Machipongo River**. **Willis Wharf**, a town on the west bank of **Parting Creek** a mile above the junction with **Machipongo River**, is a base for shellfish and fishing boats. Gasoline is available; there is a marine railway for the fishing boats. The controlling depth is about 6 feet to the wharves at **Willis Wharf**.

**Chart 563.**—**Sand Shoal Inlet**, the ocean entrance between **Cobb Island** and **Wreck Island**, may be entered through three channels. **Northeast Channel**, protected by extensive shoaling to northward and marked by buoys shifted in position with changing channel conditions, leads along the south end of **Cobb Island**; the controlling depth is about 10 feet over the bar. **Southeast Channel** is straight, but the bar breaks in heavy weather; the controlling depth is about 10 feet over the bar. **South Channel**, east of **Wreck Island**, has a controlling depth of about 8 feet. The latter two channels are not marked and should not be used by strangers.

A good fair-weather anchorage is in the channel near the discontinued Coast Guard station east of **Little Cobb Island** for boats able to cross the entrance bar with 3 feet over it.

**Sand Shoal Channel** extends westward from **Sand Shoal Inlet** for 6 miles where it joins a dredged channel to the wharves and public bulkhead at **Oyster** on the mainland. The controlling depth is about 5 feet to the town.

**Oyster** is the shipping point for a large amount of seafood. Fuel and some supplies are available; a marine railway can haul out craft up to 45 feet in length for repairs.

**Ship Shoal Inlet**, the ocean entrance between **Ship Shoal Island** and **Myrtle Island**, is shallow and unmarked; it is used only by local oyster boats. There is deep water back of the inlet but the channels to the inside passages are shallow and tortuous.

The danger zone of a bombing and gunnery range is centered on **Myrtle Island**, 6 miles northeastward of **Cape Charles Light**; see 204.48, chapter 2, for limits and regulations.

**Little Inlet**, between **Myrtle Island** and **Smith Island**, is shallow and is little used. Small boats can connect with the inside passage at high water.

**Cape Charles** and the islands on the north side of the

entrance to **Chesapeake Bay** are described in chapter 9.

**Smith Island Inlet**, between **Smith Island** and **Fisherman Island**, is fairly wide but the narrow, changeable channel lies between sandbars and breakers. The inlet is used by many local boats with drafts of 3 to 4 feet, but it is unmarked and should not be used by strangers. The controlling depth over the bar is said to be 1½ feet.

**Charts 1220 to 1222.**—**Virginia Inside Passage** is between the barrier beach along the Atlantic Ocean on the east and the Virginia portion of the mainland peninsula on the west. The passage extends 74 miles from the south end of **Chincoteague Bay** through creeks, thorofares, marshy cuts, and bays to enter **Chesapeake Bay** at **Cape Charles**. The route is marked with lights and daybeacons which have daymarks with white reflector borders to distinguish them from aids to navigation marking other waterways. Buoys are temporarily established from time to time to mark destroyed aids or critical places.

The Federal project depth is 6 feet for the waterway. Maintenance dredging is performed to provide a 6-foot controlling depth, but due to continuous shoaling 3 feet or less may be found in places, particularly inside the ocean inlets. The overhead clearance is limited only by the 40-foot fixed bridge across **Cat Creek**, 8 miles southward of **Chincoteague**, the 50-foot clearance of the power cable over **Longboat Creek** inshore from **Metomkin Inlet**, 22 miles southward of **Chincoteague**, and the 40-foot fixed bridge at **Cape Charles**.

The mean range of tide varies from 2.5 to 4.5 feet in the inlets along the Virginia coast; greater fluctuations in the water level in the inside waters are caused by high winds and storms.

Fuel, repairs, and some supplies can be obtained at **Wachapreague**, 29 miles south of **Chincoteague** and 43 miles north of **Cape Charles**, and at **Oyster**, 60 miles south of **Chincoteague** and 12 miles north of **Cape Charles**.

From **Chincoteague**, the **Virginia Inside Passage** follows **Chincoteague Channel** across **Chincoteague Inlet** to **Walker Point**, thence through **Ballast Narrows**, **Island Hole Narrows**, the dredged cut in **Bogues Bay**, and **Cat Creek** to the sloughs marked by lights and daybeacons back of **Assawoman Inlet**, 10 miles southwestward of **Chincoteague**. The fixed highway bridge over **Cat Creek** has a clearance of 40 feet. The overhead power cable just north of the bridge has a clearance of 60 feet.

From a mile back of **Assawoman Inlet**, the inside passage continues through **Northam Narrows**, thence through dredged cuts in **Kegotank Bay** and back of **Gargathy Inlet** to **Wire Passage**, 15 miles southwestward of **Chincoteague**.

From **Gargathy Inlet**, the inside passage goes through **Wire Passage** into a dredged cut in **Metomkin Bay** and enters **Folly Creek** westward of **Metomkin Inlet**. From a point near light 81, a 5-foot channel extends some 350 yards up **Parker Creek**. **Folly Creek**, which leads westward from the south end of **Metomkin Bay**, has a depth of 1 foot to the landing at its head, 3 miles above the mouth.

The passage continues through a dredged cut from Folly Creek into **Longboat Creek** which has a power cable over its northern part with a clearance of 50 feet, thence through cuts in **Cedar Island Bay**, **Teagles Ditch**, and **Burtons Bay** into Wachapreague Channel which leads to Wachapreague, 29 miles southward of Chincoteague. Supplies and repair facilities are available at Wachapreague; refer to previous description in this chapter.

From Wachapreague Channel, the passage continues through a cut in **Bradford Bay**, a part of **Millstone Creek**, a cut in **Swash Bay**, a part of **The Swash**, and **Little Sloop Channel** to Sandy Island Channel, 3 miles inside Little Machipongo Inlet and 36 miles southward of Chincoteague.

The passage southward of Little Machipongo Inlet follows **Sloop Channel** and a dredged cut into **Cunjer Channel**, thence westward in **North Channel** at the north end of **Hog Island Bay** to Great Machipongo Channel, 43 miles southward of Chincoteague.

After passing through Great Machipongo Channel to a point 2 miles inside Great Machipongo Inlet, the route goes westward through **Gull Marsh Channel**, thence southwestward through a natural channel and cut in **Outlet**

**Bay** and **Spidercrap Bay** to **Eckichy Channel**, thence southeastward to Sand Shoal Channel, 1.5 miles inside Sand Shoal Inlet, 56 miles southward of Chincoteague.

Supplies and repair facilities are available at Oyster on the mainland west of Sand Shoal Inlet, 60 miles south of Chincoteague; refer to previous description in this chapter.

From inside of Sand Shoal Inlet, the passage continues westward through Sand Shoal Channel and southward through **Mockhorn Channel** to Magothy Bay.

**Magothy Bay**, which extends southward from Mockhorn Channel to Smith Island Inlet, is shallow except in the well marked inside passage which passes through the bay to Cape Charles. **Magotha**, a village on the west side of the bay 3.5 miles northwestward of Cape Charles Light, handles oysters at the wharves; a depth of about 2 feet can be carried to these facilities.

From the southern part of Magothy Bay, the passage continues southwestward through a dredged cut across Cape Charles into the deep water in Chesapeake Bay. The fixed highway bridge over the passage from Cape Charles to Fisherman Island has a clearance of 40 feet.

## 9. CHESAPEAKE BAY ENTRANCE

**Chart 1222.**—Chesapeake Bay, the largest inland body of water along the Atlantic coast of the United States, is 168 miles long with a greatest width of 23 miles. The bay is the approach to Norfolk, Newport News, Baltimore, and many lesser ports. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Fisherman Island on the north and Cape Henry on the south. Medium-draft vessels can enter from Delaware Bay on the north via Chesapeake and Delaware Canal, and light-draft vessels can enter from Albemarle Sound on the south via the Intracoastal Waterway.

**Mileages.**—Many of the distances in this and later Chesapeake Bay chapters are given in miles above the Virginia Capes, or "the Capes," which is a short way of referring to a line from Cape Charles Light to Cape Henry Light.

**Chesapeake Light** ( $36^{\circ}54.3'$  N.,  $75^{\circ}42.8'$  W.), 117 feet above the water, is shown from a blue tower with white superstructure on four piles, 14 miles eastward of Cape Henry. The name CHESAPEAKE is displayed on all sides. A fog signal and radiobeacon are operated at the station; storm warning displays are made during the daytime only.

**Cape Charles**, on the north side of the entrance, is low and bare, but the land back of it is high and wooded. **Wise Point** is the most southerly mainland tip of the cape. **Low Fisherman Island** is a mile south of Wise Point.

The southwest end of **Smith Island** is 2 miles eastward of Wise Point; the island is 6 miles long, is low and sparsely wooded, and is awash at half tide midway along its length.

**Cape Charles Light** ( $37^{\circ}07.4'$  N.,  $75^{\circ}54.4'$  W.), 180 feet above the water, is shown from a 191-foot octagonal, pyramidal skeleton tower, upper part black and lower part white, on the southwestern part of Smith Island. The ruins of the old lighthouse are in shallow water 0.7 mile eastward of the light.

**Smith Island Shoal**, which breaks in heavy weather, has depths of 21 feet 7.5 miles east-by-south of Cape Charles Light. Depths less than 40 feet extend another 5 miles northeastward. Outer limits of the shoal area are marked by a lighted buoy.

**Nautilus Shoal**, which extends 4 miles southeastward from Fisherman Island, has patches with depths of 6 to 11 feet. The buoyed channel along the southwest side of Nautilus Shoal, thence northward between Fisherman Island and **Inner Middle Ground**, has a controlling depth of about 18 feet; the channel is used by local vessels drawing up to 12 feet, but is not recommended for strangers.

**Chart 562.**—Cape Henry, on the south side of the entrance, has a prominent range of sand hills about 80 feet high.

**Cape Henry Light** ( $36^{\circ}55.6'$  N.,  $76^{\circ}00.4'$  W.), 164 feet above the water, is shown from a 163-foot octagonal, pyramidal tower, upper and lower half of each face alternately black and white, on the beach near the turn of the cape; the light station has a radiobeacon and a fog signal. This particular station also is equipped for special radio-direction-finder calibration; see Light List for operational information.

The gray octagonal, pyramidal tower 110 yards southwest of Cape Henry Light is the abandoned 1791 light-house. At the signal tower 0.3 mile northwest of the light, the Hampton Roads Maritime Association, in co-operation with the Weather Bureau, maintains a reporting station from which vessels are reported to Hampton Roads; vessels can communicate with the station by signal light in International Code or through the marine telephone operator; messages from or to vessels can be relayed by the station. See appendix for storm warning displays.

A naval restricted area extends northward and eastward from Cape Henry; see 207.158, chapter 2, for limits and regulations.

**Virginia Beach** is a summer resort 5 miles south of Cape Henry Light. The buildings are conspicuous, the most prominent being the Cavalier Hotel which is distinguished by its size and its cupola. **Virginia Beach Coast Guard Station** is a mile south of the hotel.

The **Chesapeake Bay Bridge-Tunnel** extends from Cape Charles across the bay entrance to a point 6 miles westward of Cape Henry. The 15-mile crossing has vehicular tunnels under Chesapeake Channel and Thimble Shoal Channel with bridges over Fisherman Inlet and secondary channels. In addition to the channel buoys, lights and fog signals mark the openings at Chesapeake and Thimble Shoal Channels.

**Boundary lines of inland waters.**—The lines established for Chesapeake Bay Entrance are described in 82.30, chapter 2.

**Channels.**—The deepest approach to Chesapeake Bay is from southeastward off Cape Henry. The controlling depth is about 50 feet from lighted whistle buoy 2CB, 8.5 miles southeastward of Cape Henry Light, to the Virginia Capes. The approach from lighted whistle buoy 2, 10 miles east by north of Cape Henry Light, has a controlling depth of about 34 feet. Federal project main-channel depths are 42 feet from the Virginia Capes to Baltimore and 40 feet from the capes to Hampton Roads.

The well-marked channel to Baltimore is discussed further in chapters 11 to 15.

**Bridges.**—See 203.240, chapter 2, for general operating regulations of drawbridges across Chesapeake Bay tributaries; special regulations are given in 203.245 to 203.349, chapter 2.

**Tides.**—The mean range of tide is 2.8 feet at Cape Henry.

**Currents.**—The current velocity is 1.0 knot on the flood and 1.5 knots on the ebb in Chesapeake Bay Entrance; see the Tidal Current Tables for daily predictions.

**Pilotage.**—Virginia and Maryland pilot boats are stationed in the entrance. Virginia pilots are taken to any port in Virginia and Maryland pilots to any port in Maryland, but vessels bound for Washington, D.C. may take either. Whistle signals are one long and one short blast for a Virginia pilot and three longs and one short for a Maryland pilot. Both pilot boats maintain radio watch on 2182, 2638, and 2738 kcs. Maryland pilots carry portable radiotelephones for bridge-to-bridge communication on 156.9 mc.

Every ship arriving from or bound to a foreign port is obliged to receive a pilot. Pilotage is optional for vessels employed in or licensed for the coasting trade if they have on board a pilot licensed by the Federal Government to operate in these waters.

**Charts 481, 562.**—Thimble Shoal Channel, the improved approach to Hampton Roads, begins 2 miles northwest of Cape Henry Light and extends 10 miles west-northwestward; a Federal project provides for mainchannel depths of 40 feet. See 207.40, chapter 2, for navigation regulations.

Naval and merchant-vessel anchorages have been established south of Thimble Shoal Channel; see 202.168, chapter 2, for limits and regulations.

**Lynnhaven Roads,** an open bight westward of Cape Henry, is protected from southerly winds and is sometimes used as an anchorage. The former dumping-ground area in the western part of the bight has shoals and obstructions with depths as little as 12 feet; elsewhere, general depths are 20 to 28 feet. Eastward of Lynnhaven Inlet the 18-foot curve is no more than 0.3 mile from shore; westward of the inlet the shoaling is gradual and depths of 18 feet can be found 0.8 mile from shore.

There are two small-craft openings in the Chesapeake Bay Bridge-Tunnel south of Thimble Shoal Channel. Each fixed span has a clearance of 21 feet.

**Lynnhaven Inlet,** 4 miles westward of Cape Henry Light, in 1966 had a controlling depth of 10 feet over the buoyed bar. The channel is subject to shoaling despite occasional dredging. The fixed highway bridge over the inlet has a clearance of 35 feet. Lynnhaven Bay, south of the inlet, has depths of 2 to 10 feet.

**Long Creek,** which leads eastward from Lynnhaven Inlet to Broad Bay, has depths as little as 1 foot and many unmarked shoals in the deeper sections. The fixed high-

way bridge 1.2 miles from the inlet bridge has a 40-foot channel span with a clearance of 20 feet.

**Broad Bay Canal,** a privately dredged cut that provides a more direct route from Lynnhaven Inlet to Broad Bay, leaves Long Creek a mile from the inlet and leads eastward to the bay; the controlling depth is about 4 feet. The fixed highway bridge over the cut has a clearance of 35 feet; nearby overhead cables have a clearance of 55 feet.

Depths are about 7 feet in Broad Bay. A marked channel with a controlling depth of about 4 feet leads south-eastward through **The Narrows** to the southern end of **Linkhorn Bay** near Virginia Beach.

Extreme caution is necessary when operating in the waterways inside Lynnhaven Inlet because of the many visible and submerged obstructions.

Small-craft supplies, fuel, and berths are available inside Lynnhaven Inlet and in both forks of Linkhorn Bay. Repairs can be made; largest marine railway, 30 feet; lift 2½ tons.

**Little Creek** is entered between jetties 8 miles westward of Cape Henry Light. Most of the basin comprises the **U.S. Naval Amphibious Base**, but the Pennsylvania Railroad operates car floats from the south end terminal to the town of Cape Charles on the Delmarva Peninsula; small craft use the west arm.

The channel in Little Creek to the Pennsylvania Railroad terminal, 1.2 miles south of the jetties, has a controlling depth of about 19 feet. Lights mark the channel and a fog signal is on the east jetty. A Coast Guard station is eastward of the railroad terminal; see appendix for storm warning displays.

**Fishermans Cove,** on the west side of the main Little Creek basin, has fuel and berthing facilities for small craft. Supplies are available and repairs can be made; largest marine railway, 55 feet; lift, 25 tons. A speed limit of 5 knots is prescribed for Fishermans Cove; see 207.157a, chapter 2.

Navy danger zones and restricted areas extend northward from the vicinity of Little Creek to the edge of Thimble Shoal Channel; see 204.51 and 207.157, chapter 2, for limits and regulations.

**Chart 400.**—Hampton Roads, at the southwest corner of Chesapeake Bay, is entered 16 miles westward of the Virginia Capes. It includes the Port of Norfolk, encompassing the cities of Norfolk, Portsmouth, and Chesapeake, and the Port of Newport News, which takes in the cities of Newport News and Hampton.

Hampton Roads is the world's foremost bulk cargo harbor. Coal, petroleum products, grain, sand and gravel, and fertilizer constitute more than 90 percent of the heavy traffic movement by water, although an increasing amount of general cargo is handled by the Hampton Roads ports.

**Channels.**—The approach to Hampton Roads is through the 40-foot Thimble Shoal Channel. There are natural depths of 80 to 20 feet in the main part of Hampton

Roads, but the harbor shoals to less than 10 feet toward the shores. Dredged channels lead to the principal ports.

Federal project depth is 40 feet in the two main channels in Hampton Roads which are well marked by lighted buoys. One leads southward along the waterfronts of Norfolk, Portsmouth, and Chesapeake to the first bridge across the Southern Branch of Elizabeth River, and the other leads westward to the waterfront at Newport News at the entrance to James River.

**Anchorage.**—Numerous anchorages have been established in Hampton Roads and Elizabeth River; see 202.168, chapter 2, for limits and regulations. The areas are shown on charts 400 and 452.

**Tides.**—The mean range of tide is 2.5 feet in Hampton Roads. See Tide Tables for daily predictions of tides at Sewells Point.

**Currents.**—Information for several places in Hampton Roads and Elizabeth River is given in the Tidal Current Tables. The currents are influenced considerably by the winds and at times attain velocities in excess of the tabulated values. The current velocity is 1.1 knots in Hampton Roads and 0.6 knot in Elizabeth River.

**Ice.**—Hampton Roads is free of ice. In severe winters the upper part of Southern Branch, Elizabeth River, is sometimes closed for short periods.

**Pilotage** for Hampton Roads ports is performed exclusively by the Virginia Pilot Association; refer to discussion at beginning of chapter.

**Towage.**—Vessels usually proceed from Cape Henry to points in the Hampton Roads port area under their own power and without assistance. A large fleet of tugs is available at Norfolk to assist in docking or undocking and in shifting within the harbor.

**Quarantine.**—The quarantine station is at Fort Monroe on Old Point Comfort. Arriving vessels subject to quarantine and bound for Hampton Roads ports or Richmond must remain at the quarantine anchorage southwestward of Old Point Comfort until granted clearance. The U.S. Public Health Service Hospital is on Hampton Boulevard, Norfolk, and an outpatient office is at Newport News. The U.S. Naval Hospital is in Portsmouth.

**Customs.**—Hampton Roads is a port of entry with customhouses at Norfolk and Newport News. Marine documents are issued.

**Immigration.**—Vessels are boarded by immigration officers at the quarantine anchorage southwest of Old Point Comfort, or, at request of ships' agents, upon arrival at the dock. Non-quarantine vessels are boarded at the dock. All crew members are subject to inspection before landing. All passengers, stowaways, and workaways must be entered on alien passenger manifests and safely detained aboard until instructions are issued by the immigration officer for their disposal. Vessels from foreign ports bound direct for Richmond are required to stop at Newport News for immigration inspection unless inspected at quarantine anchorage.

**Harbor regulations.**—Port regulations are principally concerned with grain and coal handling, port charges,

pilotage and stevedoring. Anchorage regulations are covered in 202.168, chapter 2.

**Wharves.**—The Hampton Roads area has more than 200 piers and wharves along more than 30 miles of improved waterfront. Included are coal piers; oil-storage and bunkering facilities; general-cargo, grain, and ore piers; and marine railways and drydocks. Available depths are 30 to 35 feet at the general-cargo, ore, and grain piers; 35 to 36 feet at the coal piers; and 30 to 45 feet at the oil-storage and bunkering facilities.

**Supplies.**—The principal coal-handling and bunkering piers are those of the Norfolk and Western Railway at Lambert Point, Norfolk, and of the Chesapeake and Ohio Railway at Newport News. Bunker oil is available at Sewells Point, in Southern Branch of Elizabeth River, and at Newport News, or it can be delivered from barges in the stream. Fresh water is available on the principal piers and can be supplied from barges. The area also has numerous ship chandlers and marine suppliers.

**Repairs.**—Hampton Roads has extensive facilities for drydocking and hauling out. The largest floating drydock at Norfolk has a capacity of 15,000 tons, and the largest marine railway can handle 5,500 tons. The shipyard at Newport News is one of the largest and best-equipped in the United States; the principal graving dock has a length of 1,100 feet on the keel blocks. There are many other yards that are especially equipped to handle small vessels.

Wrecking and salvage work is not a specialty of the Hampton Roads shipyards, but they have the equipment for such service if the need arises. Additional gear can also be brought in from New York.

**Communications.**—The Hampton Roads ports are served by several large railroads and by a terminal beltline; in addition more than 50 motor truck carriers serve the ports. Many steamship lines connect Hampton Roads with the principal United States and foreign ports; most of the lines have regular sailings and others maintain frequent but irregular service. Three airlines offer prompt air-freight, express, and passenger service from Norfolk and Newport News to major United States airports where connections can be made for overseas destinations.

**Thimble Shoal Light (37°00.9' N., 76°14.4' W.),** 55 feet above the water, is shown from a red conical tower on a brown cylindrical pier on the eastern edge of the shoal; a fog signal is sounded from the station. The light is 12.3 miles from the Virginia Capes. Thimble Shoal is the southern edge of the Horseshoe, which is described in chapter 11.

The entrance to Hampton Roads is between Willoughby Spit and Old Point Comfort, 2 miles to the northward.

**Old Point Comfort** is the site of **Fort Monroe** and the quarantine station for the Hampton Roads port. The Chamberlin Hotel is an excellent landmark. **Old Point Comfort Light (37°00.1' N., 76°18.4' W.),** 54 feet above the water, is shown from a white tower. A fog signal is sounded from the knuckle of the seawall about 200 yards

eastward of the light. See appendix for **storm warning displays**. Only government craft can tie up at the wharf on the south waterfront of Old Point Comfort.

A Naval Ordnance Laboratory **restricted area** extends eastward and southward of Old Point Comfort; see **204.50**, chapter 2, for limits and regulations.

**Hampton Bar** begins about 200 yards southwestward of Old Point Comfort and extends 2 miles southwestward; depths on the bar are 1 to 5 feet. The bar is marked by two lights and by buoys along its southern edge. These lights, together with one on Hampton Flats, aid vessels in mooring in the naval and other anchorages northward of the main channel.

A buoyed channel with a controlling depth of about 10 feet leads along the west side of Old Point Comfort to the fish wharves at **Phoebus**. The wharves have depths of 8 to 12 feet at their outer ends, but are in poor condition. Small craft can anchor in depths of 8 to 20 feet along the sides of the channel. The Fort Monroe yacht piers are on the east side of the channel 0.4 mile above Old Point Comfort.

**Hampton River**, 1.5 miles westward of Old Point Comfort, is entered by a marked channel through Hampton Bar and Flats. Some small craft also enter west of Hampton Bar. **Hampton**, on the west side of the river 2 miles above the channel entrance, is an important seafood center. Traffic on the river consists of seafood and petroleum products, sand and gravel, and building materials. The residential and commercial areas of Hampton are on the west side of Hampton River; **Hampton Institute** and a Veterans Hospital are on the east side.

In 1965 the controlling depth was about 10 feet in the dredged channel across Hampton Flats and up Hampton River to the highway bridge at Hampton, except for shoaling on the west side of the entrance, and 10 feet in the dredged channel in **Sunset Creek**, on the west side just above the river mouth.

The principal commercial wharves at Hampton, just below the bridge, have depths of 7 to 12 feet at their faces. The public landing 500 yards below the bridge has depths of 8 feet at the face; small boats anchor between the public landing and the bridge. The wharves along **Sunset Creek** have depths of 4 to 9 feet at their outer ends.

Supplies and fuel are available at Hampton. A yacht club and several marinas here have berthing space. Repairs can be made; largest marine railway, 120 feet; lift, 35 tons.

**Jones Creek**, on the east side of Hampton River 300 yards above the mouth, has depths of 8 to 11 feet. The bulkheads have depths of 3 to 10 feet alongside and are controlled by the Veterans Hospital on the south and Hampton Institute on the north.

**Salters Creek**, 4 miles west-southwestward of Old Point Comfort, has a narrow unmarked approach channel with depths of 2 feet. The fixed highway bridge over the entrance has a channel width of 24 feet and a clearance of 9 feet. Numerous small craft moor in a basin above the bridge that has depths of about 5 feet.

The 40-foot project channel to Newport News was discussed earlier. Depths along the edges of the dredged section are 19 to 25 feet. The currents do not always set fair with the channel, especially with strong winds, and deep-draft vessels sometimes find it difficult to stay in the channel.

**Newport News Middle Ground Light** ( $36^{\circ}56.7' \text{ N.}$ ,  $76^{\circ}23.5' \text{ W.}$ ), 52 feet above the water, is shown from a brown conical tower on a black cylindrical pier in 15 feet of water near the western end of the shoal; a fog signal is sounded from the station.

**Newport News Point** ( $36^{\circ}57.8' \text{ N.}$ ,  $76^{\circ}24.7' \text{ W.}$ ) on the north side of the entrance to James River, is 21.5 miles from the Virginia Capes. The city of **Newport News** extends several miles along the northeast bank of James River.

**Newport News Creek**, just west of Newport News Point is a city-owned small-boat harbor used by fishing boats, pleasure craft, and petroleum barges. In 1964 the controlling depth was 11 feet in the dredged channel for 0.6 mile above the mouth. A privately maintained light marks the west side of the entrance. The bulkheads in the harbor have depths of 7 to 12 feet alongside. Fuel, supplies, and slips are available and repairs can be made; marine railway, 90 feet.

The deepwater berths at Newport News extend from just west of Newport News Point for 2.5 miles up James River.

A petroleum terminal 0.2 mile westward of Newport News Point has depths of 37 feet at the outer end.

The Chesapeake and Ohio Railway piers extend from 0.3 to 1.3 miles westward of Newport News Point; a Government pier is 0.5 mile from the point. The coal piers 0.3 mile from the point have depths of 35 to 41 feet alongside; vessels can be loaded at the rate of 9,000 tons per hour. The ore pier 0.85 mile from the point has depths of 35 to 42 feet alongside; each of three unloading cranes handles about 1,400 tons of bulk material per hour. The general cargo piers 1.1 miles from the point have depths of 30 to 35 feet alongside. Traveling 30-ton cranes are available; heavier lifts can be arranged. Oil pipelines are on the coal and ore piers; vessels can be bunkered at the rate of 1,000 barrels per hour.

The facilities of the Newport News Shipbuilding and Drydock Company begin 1.7 miles northwest of Newport News Point and extend a mile upriver; depths at the piers are 35 to 40 feet. The largest graving dock has a length of 1,100 feet, width of 140 feet, and a depth of 40 feet over the sill. The outfitting piers have cranes with capacities up to 140 tons, and the yard has floating cranes with capacities up to 100 tons.

**Willoughby Spit**, on the south side of the entrance to Hampton Roads, is a narrow barrier beach 1.3 miles long in an east-west direction. About midway between the spit and Old Point Comfort, on the opposite side of the entrance, is **Fort Wool**, which is on the south edge

of the main ship channel; a light, 25 feet above the water, is shown from the north searchlight tower on the fort.

A 45-foot wide small-boat opening about midway in the south approach bridge to Hampton Roads Tunnel has a clearance of 10 feet.

**Willoughby Bank**, with depths of 3 to 7 feet, extends east-northeastward along the edge of the main channel for about 2.5 miles from Fort Wool.

**Willoughby Bay**, on the inner side of Willoughby Spit, has general depths of 7 to 12 feet. On the south side of the bay are the prominent buildings of the Norfolk Naval Base and the Naval Air Station. A marked channel with a controlling depth of about 10 feet, 0.4 mile westward of Fort Wool, leads to a small-boat harbor behind the hook of Willoughby Spit. Some supplies, fuel and berthing are available. Repairs can be made; largest marine railway, 40 feet.

The greater part of Willoughby Bay and approaches is a seaplane **restricted area**; see 207.156, chapter 2, for limits and regulations. The northern part of the bay has been designated as a yacht anchorage; see 202.168, chapter 2, for limits and regulations.

**Charts 400, 452.**—**Norfolk Harbor** comprises a portion of the southern and eastern shores of Hampton Roads and both shores of Elizabeth River and its Eastern, Southern, and Western Branches, on which the cities of Norfolk, Portsmouth, and Chesapeake are located.

The harbor extends from off Sewells Point south in Elizabeth River to a point 0.4 mile south of the fifth bridge over Southern Branch, a total distance of 13.5 miles; it extends 1.5 miles up Western Branch to a point 0.5 mile above the West Norfolk highway bridge, and up Eastern Branch for 2.5 miles to the Norfolk and Western Railway Bridge.

The main part of Norfolk is on the east side of Elizabeth River north of Eastern Branch, with Berkley, a subdivision, to the southward between Eastern and Southern Branches. South of Berkley is the city of Chesapeake. Portsmouth is opposite Norfolk and its waterfront extends along the west shore of Southern Branch and the south shore of Western Branch. These cities form practically a single community, united by the same commercial interests and served by the same ship channel.

**Chart 400.**—**Sewells Point** ( $36^{\circ}57.8' \text{ N.}$ ,  $76^{\circ}19.6' \text{ W.}$ ), on the east side of the entrance to Elizabeth River, is 18 miles from the Virginia Capes. A breakwater, marked by a light on its outer end, extends about 0.3 mile westward from the point. The piers of the **Norfolk Naval Base** and its annex extend southward from the breakwater along the east bank of the river. Depths at the naval piers are 24 to 40 feet. A jettied basin at the base affords protection for small navy vessels in depths of 24 to 30 feet.

**Sewells Point Spit**, covered 3 to 6 feet, extends north-northeastward from the point for 1.4 miles to the outer end of Willoughby Channel.

A buoyed channel with a controlling depth of about 10 feet extends eastward and southward through Sewells Point Spit for about 1.2 miles to an enclosed boat basin used by small navy boats; the basin has depths of 5 to 7 feet.

The approach to the naval piers is a **restricted area**; see 207.155, chapter 2, for limits and regulations.

Sewells Point Terminals are 1.9 miles south of Sewells Point. The two grain elevator berths on the north side have depths of 29 to 32 feet; ships are loaded from the over-3-million-bushel storage elevator. The general cargo piers have berths for five large vessels; depths of 28 to 31 feet are alongside. Gantry cranes up to 15 tons capacity and modern cargo handling equipment are available.

A petroleum terminal, 2.1 miles south of Sewells Point, has two berths with depths of 38 feet. Vessels are bunkered at the pier.

**Maritime Norfolk Terminal**, 2.8 miles south of Sewells Point, has berths for 10 vessels at the two piers with depths of 33 to 38 feet alongside. Ten-ton gantry cranes, a floating 100-ton crane, and modern cargo handling equipment are available.

**Lafayette River**, which empties into the east side of Elizabeth River 4 miles south of Sewells Point and 22 miles from the Virginia Capes, is devoted exclusively to pleasure craft. The entrance is between **Tanner Point** and **Lambert Point**, 1.5 miles to the southward. The river has natural depths of 4 to 6 feet in the entrance, thence 6 to 20 feet for 3.5 miles to the forks, and thence 2 to 4 feet up either fork. The dredged section in the entrance to Lafayette River is marked by lights and day-beacons; the controlling depth is about 8 feet. The dredged channel turns sharply at the light off **Lawless Point**, a mile above the entrance, and vessels must be on the alert to avoid grounding. Defined anchorage areas extend up Lafayette River to the first bridge; see 202.168, chapter 2, for limits and regulations.

See appendix for **Norfolk climatological table and storm warning displays**.

**Hampton Boulevard Bridge**, 1.5 miles above the entrance to Lafayette River, has a fixed channel span with a clearance of 26 feet. A yacht club is just below the north end of the bridge.

**Knitting Mill Creek**, on the south side of Lafayette River 3 miles above the mouth, has depths of 3 feet to the head. Some supplies, gasoline, and berths are available within the creek. Repairs can be made; largest marine railway, 40 feet; lift, 10 tons.

**Granby Street Bridge**, 3.5 miles above the entrance to Lafayette River, has a 40-foot bascule span with a clearance of 14 feet. A yacht basin is 200 yards below the south end of the bridge. Some supplies, fuel, and slips are available.

Just above Granby Street Bridge (chart 452), **Lafayette River** divides into two forks, both unmarked. A fixed highway bridge over the mouth of the north fork has a channel width of 30 feet and a clearance of 10 feet. A fixed highway bridge over the south fork

a mile from Branby Street Bridge has a channel width of 27 feet and a clearance of 9 feet; another fixed highway bridge 0.3 mile farther up the south fork has a channel width of 28 feet and a clearance of 3 feet.

**Chart 452.—Craney Island**, now a part of the mainland, is on the west side of Elizabeth River 4.5 miles south of Sewells Point. The low and thinly wooded area is the site of a Navy fuel depot, and the docks and piers, all on the eastern side, are used only by Government vessels. A light, 34 feet above the water, is shown from a white skeleton structure on piles off the northeast corner of Craney Island; the station has a fog signal. The wharves have depths of 28 to 39 feet alongside. A submerged water main crosses from Craney Island to the north side of Lambert Point; vessels are cautioned not to anchor in the vicinity of the lighted range that marks the crossing.

**Lambert Point** is on the east side of Elizabeth River 5.3 miles south of Sewells Point. Norfolk and Western Railway coal piers 6 and 5 on Lambert Point have two berths each with depths of 36 to 43 feet; vessels can be loaded at the rate of more than 16,000 tons per hour.

Lambert Point Terminals, 6.3 miles south of Sewells Point, have 14 berths with depths of 32 to 35 feet alongside the general cargo piers; fumigation and cold storage facilities are available. Gantry cranes up to 25 tons capacity and modern cargo handling equipment are available.

**Western Branch** empties into the southwest side of Elizabeth River 5.8 miles south of Sewells Point and 23.8 miles from the capes. A marked channel leads from the main channel in Elizabeth River for 4.5 miles upstream. The controlling depth is about 14 feet to the second bridge, thence 7 feet to **Drum Point**, 0.5 mile above the third bridge.

The highway bridge a mile above the entrance to Western Branch has a swing span with a clearance of 4 feet; the channel is through the north opening.

**West Norfolk**, at the north end of the first bridge, has a shipyard and small-craft facilities. Supplies, fuel, and slips are available. Repairs can be made; largest marine railway, 220 feet.

**Churchland** fixed highway bridge, 2.3 miles above the entrance to Western Branch, has a clearance of 38 feet. The overhead power cable on the upper side of the bridge has a clearance of 45 feet; the transmission towers are marked by lights.

The Atlantic Coast Line Railroad Bridge at **Bruce**, 4 miles above the entrance, has a swing span with a clearance of 4 feet. **Hodges Ferry** highway bridge, 4.7 miles above the entrance, has a 32-foot bascule span with a clearance of 5 feet. See **203.245**, chapter 2, for drawspan regulations. The overhead power cable on the upstream side of the Hodges Ferry bridge has a clearance of 37 feet.

**Pinner Point** is on the southwest side of Elizabeth River 6.8 miles from Sewells Point. Most of the piers at the

point have been destroyed by fire or are in poor condition. Portsmouth Terminals, at the southerly end of Pinner Point, has a 400-foot pier with 30 feet alongside a 600-foot slip; it is used for bulk cargo.

**Scott Creek**, on the southwest side of Elizabeth River 7.3 miles from Sewells Point, has a marked channel with a controlling depth of about 7 feet to the unused fish wharves 0.6 mile above the entrance. Some pleasure craft use the river and tieup at the fish wharves or in the small-boat basin to the westward.

**Hospital Point**, on the southwest side of Elizabeth River 7.5 miles from Sewells Point, is the site of a U.S. Naval Hospital. The main hospital building, the largest structure along the southwest side of Elizabeth River, is visible for many miles. The hospital landing has depths of about 18 feet at the face.

**Norfolk**, or parts of it, has been described at some length in the preceding text. The midpoint of the downtown section can be taken as the **City Wharf** (**36°50.9' N., 76°17.9' W.**) at the foot of West Main Street, which is on the northwest side of Elizabeth River 7.7 miles from Sewells Point and 25.7 miles from the Virginia Capes. City Wharf has depths of 15 feet at the face but is in poor condition. The wharves northwest and southwest of West Main Street have depths of 14 to 20 feet alongside.

**Smith Creek**, 7.5 miles from Sewells Point, has entrance depths of about 3 feet with deeper water inside, but entrance is restricted by a 48-foot wide fixed highway bridge with a clearance of 13 feet. Small-boat anchorage areas have been defined for Smith Creek; see **202.168**, chapter 2, for limits and regulations.

A fuel pier with depths of 8 to 15 feet at its face and some berths are on the west side of the entrance, south of the bridge; supplies are available.

The ship base of the **Coast and Geodetic Survey** is on the east side of the entrance to Smith Creek. There are 200-, 250-, and 300-foot berths along the bulkhead wharf which has depths of 20 feet alongside.

**Eastern Branch** empties into the east side of Elizabeth River 8.0 miles from Sewells Point and 26 miles from the Virginia Capes. A Federal project provides for a channel 25 feet deep to the Norfolk and Western Railway Bridge, 2.5 miles above the entrance. The channel is maintained at or near project dimensions and is marked at the critical points. Above the bridge, the natural channel has depths of 10 to 18 feet to the forks 3.3 miles from the entrance, and usually is marked by bush stakes. Anchorage areas have been established in Eastern Branch; see **202.168**, chapter 2, for limits and regulations.

Downtown Norfolk is on the north side of Eastern Branch, and **Berkley**, a subdivision, is on the south side. Traffic is fairly heavy as far as **Campostella Bridge**. Depths at most of the piers on both sides of the branch range from 14 to 25 feet.

The highway bridge 0.4 mile above the entrance to Eastern Branch has a bascule span with a clearance of 48 feet; see **203.349**, chapter 2, for drawspan regulations. The Norfolk and Western Railway Bridge 1.0 mile

above the entrance has a bascule span with a clearance of 4 feet; the overhead power cable 200 yards east of the bridge has a clearance of 150 feet.

**Campostella Bridge**, 1.4 miles above the entrance to Eastern Branch, has a bascule span with a clearance of 14 feet; see 203.245, chapter 2, for drawspan regulations. The Norfolk and Western Railway Bridge 2.5 miles above the entrance has a swing span with a clearance of 6 feet.

There are several shipyards along Eastern Branch: the largest floating drydock has a 4,000-ton capacity and handles vessels up to 360 feet in length; the largest crandall railway dock has a 5,500-ton capacity and can drydock vessels up to 450 feet in length.

**Southern Branch**, the continuation of Elizabeth River south of the junction with Eastern Branch, is a part of the **Intracoastal Waterway** route southward to Albemarle Sound. The waterway is described at length in **United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West**.

The Federal project for Southern Branch provides for a channel 40 feet deep to the first bridge, thence 35 feet deep to a turning basin 0.4 mile south of the fifth bridge. The channel is maintained at or near project dimensions, and is well marked.

A **speed limit** of 6 knots is prescribed by 207.154, chapter 2, for that part of Southern Branch between Eastern Branch and the first bridge.

The **Belt Line Railroad** bridge 1.9 miles south of the junction with Eastern Branch and 9.9 miles from Sewells Point has a vertical-lift span with clearances of 6 feet down and 142 feet up. The highway bridge 0.2 miles southerly has a vertical-lift span with clearances of 15 feet down and 145 feet up. The railroad bridge 10.9 miles from Sewells Point has a swing span with a clearance of 9 feet.

The highway bridge and Norfolk and Western Railway bridge 13.1 miles from Sewells Point have bascule spans with clearances of 7 feet; large vessels must exercise caution when making the turns to these bridges because of the current.

The facilities on the east side of Southern Branch are mostly shipyards, oil terminals, and bulk cargo piers, while Government installations front most of the west side.

A large marina on the **Portsmouth** side of Southern Branch, near the Eastern Branch junction, has depths of 6 feet to the fuel pier and most of the berths; some supplies are available.

**Imperial Docks**, on the Berkley side of the junction of Eastern and Southern Branches, has two berths with depths of 27 feet for handling tobacco and general cargo.

The shipyards at Berkley have depths of 20 to 40 feet at the piers. The largest pier can handle vessels up to 700 feet in length. A floating drydock has a capacity of 15,000 tons, and the largest marine railway can handle vessels up to 3,000 tons in a 285-foot cradle.

The **Coast Guard Base** is on the Portsmouth side of Southern Branch 8.7 miles from Sewells Point. The **Norfolk Naval Shipyard** occupies about 2 miles of the Portsmouth waterfront south of the Coast Guard Base. There are naval **restricted areas** along this reach; see 207.153, chapter 2, for limits and regulations.

The gypsum pier on the Berkley side of Southern Branch, 9.4 miles from Sewells Point, has depths of about 30 feet at the outer face.

Most of the oil terminals are at **Chesapeake**, on the east side of Southern Branch, 10 miles from Sewells Point and 28 miles from the Capes. Depths range from 30 to 40 feet alongside the piers. Vessels can be bunkered at the rate of 2,000 barrels per hour.

The grain pier on the Chesapeake side of Southern Branch 10.5 miles from Sewells Point has depths of 38 feet at the face. Ships can be loaded from the 6,600,000 bushel storage elevator at the rate of 1,000 tons of grain per hour.

Most of the piers handling chemicals, fertilizers, and other bulk cargo are south of the third bridge over Southern Branch. Depths alongside range from 20 to 35 feet.

## 10. CHESAPEAKE BAY, JAMES RIVER

**Charts 529, 530, 531.**—James River rises in the Allegheny Mountains near Clifton Forge, Va., and flows 295 miles southeastward to Hampton Roads at Newport News, 21.5 miles by main channel from the Virginia Capes. The head of commercial navigation is at Richmond, 78 miles above the mouth. The river varies in width from 1,000 feet at Richmond to 4.3 miles at the mouth. Traffic consists chiefly of petroleum products, sand and gravel, some chemicals, and shellfish. Drafts of vessels using the river above Newport News generally do not exceed 15 feet, but vessels drawing 24 feet or more navigate it occasionally.

**Mileages** shown in this chapter as Mile 0.9N, Mile 12W, etc., are the nautical miles above the mouth of James River; the letters N, S, E, and W denote by compass points the side of the river where each feature is located. Mile 0.0 is a point in the main channel on a line between Pig Point and Newport News Point; the midchannel point is 21.5 miles from the Virginia Capes.

**Channels.**—The Federal project for James River provides for dredging depths of 25 feet to Richmond Deepwater Terminal, 74 miles above the mouth, thence 18 feet to Richmond Lock at Richmond, 78 miles above the mouth. The dredged cuts are well marked. In 1965 the controlling depths were 23 feet to the terminal and thence 17 feet to within 130 yards of the lock.

**Anchorage.**—Defined anchorage grounds extend for about 7 miles above the mouth; see 202.168, chapter 2, for limits and regulations.

**Dangers.**—Numerous stakes, piling, wrecks, and other obstructions are on both sides of the main channel in James River.

**Tides.**—The mean range of tide is 2.6 feet at Newport News and Hopewell, and 3.2 feet at Richmond.

**Currents.**—The currents in James River follow the general direction of the channel except between Hog Island and Jamestown Island, 25 miles above the mouth, where they set across Goose Hill Flats. In the lower reaches the velocity of flood is about equal to that of ebb. Near Richmond the drainage flow predominates and the current seldom, if ever, sets upstream. These normal conditions are subject to change by wind and freshets.

During severe winters some drift ice appears, and at times the river freezes over, but navigation to Richmond hardly ever is suspended because the ice is broken up by a tug.

**Freshets** occur irregularly in the fall, winter, and spring; their height at Richmond ranges from 6 to 32 feet, though the latter is exceptional. The maximum freshet heights usually occur between the middle of March and

the middle of April; the freshets occurring at other times usually reach heights not greater than about 6 feet above the normal high water. The number of freshets that cause the water to rise above the level of the wharves along the main channel at Richmond averages about one per year; the water seldom rises above the level of the city wharf. The flood heights diminish rapidly below Richmond; the extreme is about 11 feet less at Dutch Gap, and the rise is not felt at Hopewell. The cutoffs have reduced the freshet height at Richmond about one foot.

**Pilotage** to ports on James River is provided by the Virginia Pilot Association. Pilotage information for the Hampton Roads ports is given in chapter 9.

The principal places for supplies above Newport News are Hopewell and Richmond. Repair facilities are limited; small marine railways operate in Chuckatuck Creek, Pagan River, Appomattox River, and at Falling Creek.

**Chart 529.**—The entrance to James River is between Pig Point and Newport News Point, 3.6 miles to the north-northeastward; the midchannel point is 21.5 miles from the Virginia Capes and is close to the Newport News Wharves, described in chapter 9.

**Nansemond River** empties into the mouth of James River between Pig Point and Barrel Point, 2 miles to the west-by-northward. Traffic on Nansemond River consists chiefly of clays and earths, sand and gravel, concrete and clay products, and petroleum products. The river is used considerably by vessels with drafts of 9 feet and has been navigated with drafts of as much as 11 feet.

A narrow channel with a controlling depth of about 12 feet leads to Suffolk, 15 miles above the mouth of Nansemond River. The channel is well marked to Western Branch, 10 miles above the mouth. Local knowledge is necessary to navigate the narrow unmarked channel above Western Branch. A dam 0.5 mile above the bridge in Suffolk is the head of navigation.

The mean range of tide in Nansemond River is about 2.8 feet at the entrance and 3.8 feet at Suffolk. The current velocity is 1.0 knot and follows the general direction of the channel.

**Pig Point**, on the south side of the entrance to James River and the east side of the entrance to Nansemond River, is the site of an inactive Marine Corps supply depot. The unmarked channel to the wharf has a controlling depth of about 4 feet. The twin tanks 0.4 mile east of the wharf are prominent. The remains of an old wharf extend northward 0.7 mile from the vicinity of the tanks and are marked at the outer end by a light.

From Pig Point to Hollidays Point, 6.5 miles upstream, Nansemond River is wide, but the channel is crooked and leads between extensive shoals that are almost bare at low water in some places. There are many fish stakes on the shoals near the mouth. Above Hollidays Point, the river is narrow and crooked, but the midchannel is clear to Suffolk.

The highway toll bridge over Nansemond River at **Town Point**, on the south side 2.4 miles above the mouth, has a bascule span with clearance of 20 feet. Just east of the bridge, a marked channel leads southward into **Bennett Creek**, which has a controlling depth of about 2 feet through the narrow channel. The creek has deeper water inside to the highway bridge which has a swing span with a clearance of 8 feet. Gasoline is available at a small-boat basin just below the bridge.

**Great Shoal**, on the northwest side of the channel a mile up Nansemond River from the bridge, has an oyster bar that bares  $\frac{1}{2}$  foot at low water; it is marked by bush stakes.

The highway toll bridge over the river at **Hollidays Point**, on the north side 6.5 miles above the mouth, has a swing span with a clearance of 7 feet. The dredged basin to a sand and gravel plant, 0.2 mile west of Hollidays Point, has depths of about 5 feet.

**Western Branch**, which empties into the west side of Nansemond River 10 miles above the mouth, has depths of about 10 feet to the fixed highway bridge at **Reids Ferry**, 1.6 miles above the mouth. A seasonal marina, 0.7 mile from the main Nansemond channel, has a pier with a depth of about 10 feet at the face. Gasoline is available. There is a 45-foot marine railway here but no repair facilities.

**Suffolk** is an important rail center on the south side of Nansemond River, 15 miles above the mouth. The highway bridge at Suffolk has a bascule span with a width of 40 feet and a clearance of 4 feet; see 203.245, chapter 2, for drawspan regulations. The overhead cables at the bridge have a clearance of 41 feet. The oil wharves just above and below the bridge have main-channel depths at their faces. Supplies must be obtained in town.

**Batten Bay**, on the west side of James River just north of Nansemond River, has general depths of 2 to 6 feet. **Ragged Island Creek**, at the north side of the bay, is shallow and little used.

**Chuckatuck Creek**, which empties into Batten Bay from southwestward, has depths of about 4 feet in the approach through the bay and deeper water inside for about 1.7 miles. The channel through the bay is marked by a light and daybeacon; the channel edges usually are marked by bush stakes.

The highway bridge over Chuckatuck Creek 0.8 mile above the mouth has a bascule span with a clearance of 21 feet; see 203.245, chapter 2, for drawspan regulations. Some supplies and fuel can be obtained at **Crittenden**, at the south downstream end of the bridge. There is a 22-ton marine railway at one of the oyster-house piers.

**James River Bridge**, Mile 4, extends 4 miles from shore to shore in a northeast-southwest direction. The main-channel vertical-lift span, 1 mile from the northeast shore, has clearances of 50 feet down and 145 feet up; at night, red lights show when the lift span is down and green lights when it is up. A fixed span midway between the two shores has a clearance of 22 feet.

**Mariners' Museum**, Mile 6E, is at the western side of **Lake Maury**.

**White Shoal**, on the southwest side of the main channel at Mile 7, is marked near its southeast end by the tower of an abandoned lighthouse. A secondary channel on the opposite side of the shoal also is marked.

**Pagan River** empties into James River at Mile 7W. Traffic on this river consists chiefly of shellfish, sand, and gravel. Controlling depth is about 7 feet to Smithfield, except for a shoal spot near light 16 where depths less than 5 feet have been reported.

The approach to Pagan River through the dredged channel southeast of White Shoal is well marked; the river inside is also marked to within a mile of Smithfield. The mean range of tide is 2.6 feet at the entrance.

**Jones Creek**, on the south side of Pagan River 0.7 mile above the mouth, has depths of about 2 feet or more across the flats at the entrance. The fixed highway bridge, 0.6 mile above the mouth, has a width of 30 feet and a clearance of 10 feet. A marina and fish pier are just below the bridge; some supplies and fuel are available; repairs can be made. A 45-foot marine railway is just above the bridge. The fixed highway bridge 2.5 miles above the mouth has a width of 40 feet and a clearance of 7 feet.

**Battery Park** is on the south side of Pagan River a mile above the mouth. Some supplies and fuel can be obtained at the boat basin near the oyster plant. Repairs can be made at a boatyard 100 yards upstream from the boat basin; marine railway, 60 feet.

**Cypress Creek**, on the south side of Pagan River 4 miles above the mouth, has depths of 4 feet or more for 2 miles. The highway bridge over the entrance has a 40-foot bascule span with a clearance of 4 feet. About 0.8 mile above the bridge an overhead power cable has a clearance of 36 feet.

Gasoline is available at a small-boat basin on the south side of Pagan River just west of Cypress Creek.

**Smithfield**, on the southwest side of Pagan River 4.5 miles above the mouth, is famous for its hams. The fixed highway bridge just above the town has a width of 30 feet and a clearance of 15 feet. Local boats tie up at the town wharves below the bridge.

**Deep Creek**, Mile 8E, is used as an overnight anchorage by many oyster boats with drafts up to 6 feet. The marked dredged channel has a controlling depth of about 7 feet to the harbor opposite Menchville. Traffic consists of some shellfish, sand, and gravel.

**Menchville** is on the northwest side of the entrance to Deep Creek. The landings at the town have depths of about 5 feet alongside. Numerous pleasure craft use Deep

Creek during the summer. Gasoline, supplies, and a 60-foot marine railway are available.

**Warwick River**, which is entered just north of Deep Creek, has depths of 4 feet or more to **Fort Eustis**, 7 miles above the mouth. An Army-maintained pier at Fort Eustis has depths of 5 feet at the face, but boats may dock overnight only in an emergency. Gasoline and water are available. The mouth of the river is sometimes used as an anchorage by small oyster boats.

**Point of Shoals**, Mile 12W, is an extensive shallow area in **Burwell Bay**. There are also wide areas of unmarked shoals between the channel and the northeastern shore. The main channel formerly circled around Point of Shoals, but is now through the dredged cut known as **Rocklanding Shoal Channel**. The old channel has shoaled but is still buoyed; the current velocity is 0.8 knot. The several small landings along the shore of Burwell Bay have depths of about 4 feet at their outer ends.

Burwell Bay is used as an anchorage for a Maritime Administration Reserve Fleet; see 207.900, chapter 2, for regulations restricting navigation in the vicinity of the decommissioned ships.

The long wharf at Mile 16.2E is the landing for **Fort Eustis**; depths of 19 feet are at the outer end. A marked dredged channel with a controlling depth of about 9 feet leads along the south side of the wharf to a boat basin at the inner end. Decommissioned ships are moored on either side of the main channel off the Fort Eustis wharf.

**Deep Water Shoals Light** (37°08.9' N., 76°38.2' W.), Mile 16.9E, 34 feet above the water, is shown from a skeleton tower on piles, in depths of 2 feet. A fog signal is at the light.

**Skiffes Creek**, Mile 17.8E, has a well marked dredged channel at the entrance leading to a pier and boat basin. The controlling depths are about 17 feet to the pier and 16 feet in the turning basin to the northward.

See appendix for storm warning displays.

An Army small-craft testing area is at the entrance to the Skiffes Creek channel; see 207.152, chapter 2, for limits and regulations.

**College Creek**, Mile 22.5N, has depths of 1 foot across the flats at the mouth, 4 feet inside for 2 miles, thence 2 feet for 0.5 mile to **Williamsburg Landing**, a mile from the town of **Williamsburg**. The creek is difficult to navigate without local knowledge. The fixed highway bridge across the mouth of the creek has a clearance of 10 feet.

**Cobham Bay**, a wide bight at Mile 25.6S, has general depths of 5 to 7 feet.

**Jamestown Island**, at Mile 26N, is the site of historic **Jamestown**, which was settled by Capt. John Smith and his 105 cavaliers in 1607. The town is on **Church Point**, Mile 28N, the northwest end of the island. The Jamestown white monument is prominent; the ruins of the old church are hidden by trees.

**The Thorofare**, between the northeast side of Jamestown Island and the mainland, is a shallow bay with depths of 2 or more feet in the eastern part and a narrow

2-foot channel through extensive mudflats in the western part.

**Mill Creek**, which empties into the north side of The Thorofare, has a depth of 1 foot at the entrance and 2 or more feet to a landing 1.5 miles above the mouth. Above the landing the creek is foul with snags and obstructions. The fixed highway bridge across the mouth of the creek has a clearance of 10 feet.

**Back River** is a 2-mile passage from the head of The Thorofare northward of Jamestown Island to James River. The passage has depths of 4 or more feet to the fixed highway bridge at the west end, thence about 2 feet over the bar to deep water in James River. An overhead power cable reported over the passage has a clearance of about 30 feet. The bridge at the west entrance has a width of 48 feet and a clearance of 12 feet.

**Powhatan Creek**, which empties into the north side of James River just westward of Back River, is used occasionally by fishermen and trappers. The creek has depths of 2 feet at the mouth, thence 4 feet or more to a marina 1.7 miles upstream. Gasoline and some supplies are available. The numerous snags along the banks can be avoided by staying in midstream, and the island 0.3 mile above the mouth should be left to northward. The fixed highway bridge 0.5 mile above the mouth has a width of 25 feet and a clearance of 12 feet. The best approach to the creek is from a point about 15 yards offshore at the entrance to Back River.

**Chart 530.—Scotland**, Mile 27.5S, is the mainland terminus of the Jamestown Ferry, which operates to **Glass House Point**, 1 mile northwest of the monument at Jamestown, across the river. Ferry slip depths are about 11 feet on the Scotland side and 20 feet on the Jamestown side. The pier at Scotland extends channelward for 700 feet, and at Glass House Point for 1,600 feet. The partly submerged remains of the old Scotland wharf are about 100 yards southeast of the slips.

**Grays Creek**, Mile 28.2S, is entered through a shallow bay. A marked 3-foot channel leads to deeper water inside. An overhead power cable at the entrance has a clearance of 42 feet. There are many snags and obstructions in the river. A marina is a mile above the mouth.

**Chickahominy River**, Mile 33N, has a controlling depth of 6 feet in the entrance channel, thence 10 feet or more to the head of tidewater navigation at a dam 19 miles above the mouth. The lock in the dam has a length of 60 feet, a width of 15 feet, and a depth of 4 feet over the sill. The lock gates are hand operated; there is no tender.

The buoyed channel through the broad flats at the entrance to Chickahominy River is entered 0.7 mile westward of Glass House Point; daybeacons mark the critical points inside. The river is used by only a few local fishermen and pleasure boatmen. The mean range of tide is 1.9 feet at the entrance.

Wharf ruins extend out about 200 yards from shore 0.5 mile above **Barrets Point**, on the east side of the en-

trance. A sunken barge lies on the eastern edge of the channel 0.8 mile above the point.

**Barrets Ferry** highway bridge, 1.3 miles above the mouth, has a swing span with a clearance of 12 feet. A pier with a depth of 7 feet at the face extends 100 yards into the river from the east bank just north of the bridge. Gasoline and some supplies are obtainable.

**Shipyards Landing**, on the east side 6.5 miles above the mouth, has a fish wharf with 10 feet at the face; the buildings at the wharf are prominent from downstream. A State concrete launching ramp is on the north side opposite **Watts Point**, 2 miles above Shipyards Landing. The overhead power cable upstream from Watts Point has a clearance of 44 feet.

A cutoff channel through the bend of the river 10 miles above the mouth has a controlling depth of 5 feet. Small boats able to pass through the cut can save 1.2 miles.

A pier on the west side 11 miles above the mouth, just north of **Mt. Airy**, has a depth of 9 feet at the face. Gasoline and some supplies are available.

**Lanexa**, on the east side 15 miles above the mouth, has a landing in poor condition with depths of about 5 feet alongside.

The former ferry slip and piers at **Claremont**, Mile 37.5S, are in ruins and the bottom area to the southeastward near **Sloop Point** is foul. The former ferry slip across the river at **Sandy Point** is also in ruins.

**Upper Chippokes Creek**, Mile 38.5S, has depths of 5 feet for 3 miles, thence 2 feet for 1 mile to the head of navigation. The channel into the creek is close along the south bank. A wreck off the creek entrance is close to the southwest side of James River main channel and is marked by a light; the wreck extends about 2 feet above high water.

**Brandon wharf**, Mile 39.3W, is a landing with depths of 20 feet alongside.

**Sturgeon Point**, Mile 42.5N, is the site of an abandoned brickyard. The point is marked by a light.

**Wards Creek** empties into James River at Mile 46S. A depth of 2 feet can be carried across the mudflats at the entrance by following the east bank at a distance of about 75 yards. Above the mouth, depths are 4 to 10 feet for 1.7 miles. The creek is an excellent storm anchorage for any boat able to enter. **Pope Wharf** on the south side of the James River, west of Wards Creek entrance, has depths of 5 feet at the face.

**Fort Powhatan**, Mile 46.8S, is marked by a light.

**Ruffins Wharf**, Mile 48.2E, has depths of about 16 feet at the face.

**Wilcox Wharf**, Mile 50N, is in poor condition. The far end of the pier is in ruins.

**Powell Creek**, Mile 53S, has depths of 7 feet through a narrow channel across the mudflats at the entrance and for 2 miles upstream. The creek is a good storm anchorage.

In 1965 a highway lift bridge was under construction across James River at **Jordan Point**, Mile 56.4S, to re-

place the vehicular ferry operating between the point and the north side of the river. Design clearances of the bridge are 50 feet down and 140 feet up.

**Chart 531.—Hopewell**, Mile 59W, is the site of several industries and the terminus of a branch railroad to Petersburg. The chemical pier 0.8 mile southeastward of **City Point** has two berths with depths of 30 feet. The petroleum pier 0.5 mile from the point has main-channel depths. Other wharves along the waterfront southeastward of City Point are in poor condition. Supplies may be obtained in the city.

**Appomattox River**, Mile 59.5W, is navigable to Petersburg, 10 miles above the entrance. The controlling depth is about 7 feet to the first fixed bridge at Petersburg. The difficult part of the channel through the flats at the mouth is marked by lights and daybeacons; a general midchannel course is best through the remainder of the river. The mean range of tide is 2.9 feet at Petersburg.

The highway bridge 1.2 miles above the mouth of Appomattox River has a swing span with a clearance of 11 feet. The Hopewell Yacht Club, on the south side 0.2 mile west of the bridge, has a small-boat basin with depths of about 6 feet off the T-pier. Gasoline and some supplies are available; diesel fuel by truck. Repairs can be made; marine railway, 60 feet.

The railroad bridge 2.4 miles above the mouth has a swing span with a clearance of 10 feet; see 203.245, chapter 2, for drawspan regulations. An overhead power cable 0.8 mile above the bridge has a clearance of 100 feet.

There is a small-boat harbor 7.5 miles above the entrance of Appomattox River. Some supplies, gasoline, and berths are available; diesel fuel by truck. Repairs can be made; marine railway, 100 feet.

A conveyor belt with a 50-foot movable span and an overhead clearance of 11 feet crosses the river 8.1 miles above the mouth. A small marina with a marine railway is 0.2 mile above the conveyor crossing.

The channel in Appomattox River is blocked at the first fixed highway bridge east of Petersburg by silt from construction work. An overhead power cable 0.2 mile below the bridge has a clearance of 51 feet.

**Petersburg**, at the head of tidewater navigation 10 miles above the mouth of Appomattox River, is an important rail center and a customs port of entry. The bulkheads at the city are in poor condition. Supplies are not available at the waterfront, but all kinds may be obtained in the city.

Above its junction with Appomattox River, James River becomes narrow and winding. The bends are often referred to as the **Curles of the River**, and the 14-mile section from Hopewell to Wilton has been called **The Corkscrew**.

**Turkey Island Bend**, 2 miles north of Hopewell, has depths of 10 to 30 feet around its 6-mile length, but is seldom used except by pleasure boats because the main channel now leads northwestward through Turkey Island

Cutoff; most of the landings along the bend are in ruins. The north and west sections of the bend afford excellent anchorages because the river current has been greatly diminished by the cutoff and winds from any direction have little effect; the bottom is mostly soft mud.

**Turkey Island Cutoff**, Mile 61, is a mile long and well marked by lights. A cable ferry crosses the lower part of the cutoff; vessels must proceed with caution when the ferry is underway, as the cable comes to the surface. **Jones Neck Cutoff**, Mile 64, extends about a mile northward and westward; the cutoff is well marked by lights. The old river bend around **Jones Neck** has depths of 13 to 44 feet along its 4.5-mile length, but is now little used; most of the landings are in ruins.

**Dutch Gap**, Mile 66.5, the first canal dug in the United States, was cut through in 1611. The main channel extends west-northwestward through **Aiken Swamp-Dutch Gap Cutoff**, which is about a mile long and is marked by lights at both ends. There is a gravel basin in **Hatcher Island**, on the north side of the cutoff.

The old river bend around **Hatcher Island** has depths of 7 to 25 feet along its 2-mile length. **Richmond Yacht Basin**, north of **Hatcher Island**, has piers with depths of about 12 feet at their outer ends; the small marine railway can haul out boats up to 40 feet in length for repairs. There is a gasoline pump on one of the piers. A fixed highway bridge over the western entrance to the bend has a width of 40 feet and a clearance of 21 feet.

The old channel southward from **Dutch Gap** has depths of 9 feet or more for over a mile to the gravel basin in **Farrar Island**.

A concrete-and-steel wharf of the Virginia Electric and Power Company, at Mile 67.5S, has main-channel depths at the face. A privately maintained light is shown from the end of the wharf. The overhead cable just above the wharf has a clearance of 165 feet. About 300 yards westward is another cable with a clearance of 166 feet.

At a small marina at Mile 68.6N, gasoline and slips are available. A chemical plant pier at Mile 71.3S has depths of 20 feet alongside.

The oil wharf at **Drewrys Bluff**, Mile 71.7W., is of concrete construction and has main-channel depths at the face. The wharf is marked by lights; mooring dolphins are available.

The entrance to **Falling Creek** is at Mile 72.4W, where there is a marina with depths of 6 feet at the fuel pier.

Some supplies, fuel, and slips are available. Repairs can be made; marine railway, 65 feet.

**Richmond Deepwater Terminal** at **Warwick**, Mile 74W, has a turning basin and 1,200 feet of berthing space with depths of 20 feet at the face of the piers. The terminal has transit sheds and warehouses, and good rail and highway connections; it is used for receipt and shipment of general cargo. An electric gantry crane on the wharf has a 10-ton capacity. Fresh water is available in quantity. There is a small-boat landing at the north end of the wharf with depths of 13 feet at the face.

**Richmond**, the capital of Virginia, is at Mile 78E. Traffic to and from the city consists chiefly of petroleum products, sand and gravel, sulfur, and newsprint. Commercial navigation in the river proper ends at the city wharves, but small boats can go a mile farther. The Turnpike fixed highway bridge just below **Mayos Island** has a clearance of 40 feet.

General cargo for **Richmond** is handled at the wharves on the east side of the river at **Upper Municipal Terminal** which has a 700-foot turning basin. The depth at the face is about 18 feet but only 11 feet in the basin. Several oil wharves are on the west side. Some of the wharves have rail connections, and most have main-channel depths at their faces. Fresh water is available between 8 a.m. and 5 p.m., Monday through Friday. All types of fuel can be obtained by truck delivery and supplies can be delivered from the city.

A marina across the river from the **Upper Municipal Terminal** has depths of 8 feet at the fuel pier.

**Richmond** is a customs port of entry, and the U.S. Public Health Service has an outpatient office in the city. The harbor master at **Richmond Deepwater Terminal** assigns berths and anchorages; the city has a tugboat.

See appendix for **Richmond climatological table**.

The **Kanawha Ship Canal**, at the north end of the **Richmond waterfront**, is reached through a masonry lock with a length of 168 feet, a width of 35 feet, and a vertical lift of 15 feet; the lock is operated by hand, from 8 a.m. to 4 p.m., Monday through Friday. A 48-hour advance notice to the harbor master is required. The canal is said to have depths of about 12 feet but is now little used except by small private boats. The railroad bridge about 150 yards above the lock has a 30-foot bascule span with a clearance of about 2 feet; 8 hours advance notice to the harbor master is required to open the span.

## 11. CHESAPEAKE BAY, YORK AND RAPPAHANNOCK RIVERS

**Charts 1222, 1223.**—From Old Point Comfort to Potomac River, the western shore of Chesapeake Bay is mostly low. The principal tributaries are Back River, Poquoson River, York River, Mobjack Bay, Piankatank River, Rappahannock River, and Great Wicomico River. York River and Rappahannock River are broad and deep at their entrances and are navigable for long distances. Fishtraps are thicker in this area than in any other part of the bay. Ice is seldom encountered this far south in the bay, but may be found in the upper parts of some of the tributaries.

**Channels.**—The Federal project for Chesapeake Bay provides for a depth of 42 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore. There are three dredged sections in the lower Chesapeake Bay: the first off Cape Henry, just above the Virginia Capes; the second off York Spit, 11 to 22 miles above the Capes, and the third off Rappahannock Spit, 40 to 46 miles above the Capes; they are well marked.

**York Spit Channel** begins 11 miles above the Capes and extends northward another 11 miles; see 207.130, chapter 2, for navigation regulations of the channel. The current velocity is about 1.0 knot in the channel.

**Chart 562.**—The **Horseshoe** is a shoal that extends several miles out from the shore between Old Point Comfort and Back River, 6.5 miles to the northward. The southern edge of the shoal lies along the north side of the main channel into Hampton Roads; the eastern half has depths of 13 to 18 feet, and the western half, 6 to 11 feet. Local vessels drawing 7 feet or less use the lanes through the fishtraps on the Horseshoe when navigating between Hampton Roads and York River or Mobjack Bay. The tidal current velocity is 0.5 knot over the Horseshoe and is rotary, turning clockwise.

**Back River** empties into the west side of Chesapeake Bay 7 miles northward of Old Point Comfort between Northend Point and Plumtree Point, a mile to the northward. A firing and bombing danger zone is north of the entrance to Back River; see 204.49, chapter 2, for limits and regulations. The approach to Back River, from southeastward through a lane in the fishtraps, is well marked. The mean range of tide is 2.3 feet at the entrance.

About 2 miles above the mouth, Back River divides into Northwest Branch and Southwest Branch, which have general depths of 2 to 5 feet. The Langley Field hangars, water tanks, and wind tunnel back of Willoughby Point,

can be seen for many miles. The marked dredged channel that extends 3 miles from the mouth of the river to the Langley Field fuel pier on the west side of Southwest Branch has a controlling depth of about 13 feet. The Langley Yacht Club, just south of the fuel pier, has gasoline and supplies; the depth in the basin is about 4 feet. A marked side channel to the Langley Field boathouse, on the south side of Northwest Branch 3 miles above the river mouth, has a controlling depth of about 7 feet.

A marina on the south side of Back River, just east of Windmill Point a mile above the mouth, has gasoline and supplies; marine railways can haul out boats up to 40 feet. The depth to the marina is about 3 feet.

**Harris River**, on the south side of Back River west of Windmill Point, has depths of 6 feet in a marked channel that leads to a marina inside Stony Point. Some supplies, fuel, and berths are available. Repairs can be made; marine railway, 30 feet; lift, 10 tons.

Gasoline and some supplies can be obtained at Messick Point, on the north side of Back River 1.5 miles above the mouth. Repairs can be made; marine railway, 40 feet.

The side-by-side highway and rail bridges over Southwest Branch, 1.5 miles above Willoughby Point, have fixed spans with a minimum width of 18 feet and a clearance of 6 feet.

Between Back River and Poquoson River are shoals that extend 1 to 3 miles from shore; on the shoals are scattered oyster rocks that bare, or nearly bare, at low water. Strangers should stay outside the 6-foot curve.

**Chart 494.**—**Poquoson River**, which empties into Chesapeake Bay 5 miles northwest of Back River, has depths of 7 feet to the village of Yorkville, on the west side 2.5 miles above the mouth. The approach to the river is from northeastward, and is clear of fishtraps for a width of 400 yards. There is a light on either side of the entrance. The mean range of tide is 2.4 feet.

**Bennett Creek**, on the southeast side of the Poquoson River mouth, has depths of 6 feet or more for 1.3 miles to Easton Cove, which makes off to the eastward. The channel is marked as far as White House Cove, on the west side of Bennett Creek 0.8 mile above the mouth; depths of 7 to 2 feet are available for 0.7 mile above the mouth. A marine railway at a boat basin on the north side of the cove entrance can haul out boats up to 50 feet in length for hull repairs. Gasoline is available at a wharf near the south end of the cove.

**Chisman Creek**, on the north side of the Poquoson River mouth, has depths of 9 feet or more in a narrow channel

for 1.3 miles above its entrance. There are boatyards a mile above the entrance; the largest marine railway can haul out boats up to 90 feet in length for repairs.

**Back Creek**, 1.5 miles south of York River, has depths of 7 feet for 2 miles. The entrance is marked by a lighted buoy, lights, and daybeacons. The creek is used by oystering and fishing boats. A State-owned wharf on the south side, 1.4 miles above the mouth, has a depth of about 9 feet at the face. Gasoline is available at a fishhouse on the south side, 1.8 miles above the mouth.

Passage northward from Back Creek to York River can be made through the **Thorofare**, about 0.8 mile from the mouth of Back Creek. The dredged channel is marked by lights and daybeacons, and had a controlling depth of 5 feet in 1965.

**Charts 494, 492, 495, 496.**—**York River**, formed by the junction of Mattaponi and Pamunkey Rivers 29 miles above the mouth, is 15 miles northward of Old Point Comfort and 26 miles by the main channel from the Virginia Capes. Traffic on York River consists chiefly of pulpwood, petroleum products, and shellfish. Drafts of vessels using the river are mostly 18 feet or less, but deep-draft vessels navigate the lower reaches.

York River has a broad and fairly straight channel, is well marked and easily followed. Depths are as much as 80 feet off Yorktown, and the controlling depth to West Point is about 19 feet. Vessels can anchor in the wider parts of York River channel aside from the naval areas described later.

The mean range of tide is 2.4 feet at the entrance to York River and at Yorktown, and 3 feet at West Point. The currents in York River follow the general direction of the channel except in the narrowest parts where there is a tendency to set a vessel onto the shoals. The velocity varies throughout the river; the times of slack water and strengths of current become later going up the river. The normal conditions are subject to change by winds and freshets.

Ice sometimes interferes with navigation of York River for short periods during severe winters, but in ordinary winters there is no interruption below West Point.

**Pilotage** is compulsory on York River for foreign vessels and American vessels in the foreign trade.

**Supplies** are available at Yorktown, West Point, and at other places described in this chapter. **Repairs** can be made to small vessels in Perrin River, Sarah Creek, and at other places.

**Chart 494.**—**York Spit** extends outward along the northeast side of the York River approach channel for 7 miles from Guinea Marshes; the inner half of the spit has depths of 1 to 6 feet, and the outer half 10 to 20 feet.

**York Spit Light** ( $37^{\circ}12.6' \text{ N.}$ ,  $76^{\circ}15.3' \text{ W.}$ ), 37 feet above the water, is shown from a white tower on piles, in depths of 12 feet near the outer end of the spit; a fog signal is sounded at the light. The light is 19.8 miles above the Capes.

The York River approach channel, extending from about 7 miles southeast of York Spit Light to about 3 miles northwest of the light, has a controlling depth of about 37 feet and is well marked. There are natural depths in excess of 37 feet from the north end of the dredged section to the naval installation 5 miles above Yorktown bridge, except for a 34-foot spot 0.6 mile northeastward of Tue Marshes Light.

About 1.5 miles northwest of York Spit Light, a buoyed lane extends northeastward through the fishtraps. The lane has depths of 15 feet or more and can be used by medium-draft vessels approaching York River from northward.

The swash channel through York Spit about 5 miles northwest of York Spit Light has a controlling depth of about 8 feet; it is marked by a light and buoys. The channel shows up well on a bright day.

**Naval restricted areas** extend several miles up York River from the mouth; see 207.128 and 207.129, chapter 2, for limits and regulations. Naval authorities have reported the loss of buoy anchors in the blue mud bottom of this area, and fishermen have lost their anchors in this same type of bottom for lack of retrieving power.

**Chart 492.**—The entrance to York River is between **Tue Point** and **Guinea Marshes**, 25.9 miles above the Virginia Capes.

**Tue Marshes Light** ( $37^{\circ}14.1' \text{ N.}$ ,  $76^{\circ}23.2' \text{ W.}$ ), 41 feet above the water, is shown from a white square house on brown piles, in depths of 4 feet 0.3 mile north of Tue Point; a fog signal is sounded at the light.

**Perrin River**, on the north side of York River 2 miles above the water, is shown from a white square house or proch and through a narrow marked channel to the wharf at **Perrin**, on the north side 0.3 mile above the entrance. A marine railway at the wharf can handle vessels up to 100 feet in length. A marina has fuel and some supplies. Gasoline can be obtained at the oysterhouse wharves, with 4 to 7 feet alongside, on the east side of the river entrance.

A petroleum terminal, on the south side of York River 3.3 miles above the mouth, has depths of 40 feet along the outer face; the outer end of the pier is marked by a light.

The intake for an electric powerplant, on the south side of the river 4.2 miles above the mouth, is marked by two lights.

**Wormley Creek** and **West Branch** have a common entrance on the south side of York River, 4.5 miles above the mouth. A marked channel dredged to 6 feet leads to a Coast Guard basin and pier in West Branch. Gasoline is available at a marina on the west side of Wormley Creek just above the entrance.

The Coast Guard T-pier, on the south side of York River 5 miles above the mouth, has depths of 35 feet or more at the outer end.

**Sarah Creek**, on the north side of York River 6 miles above the mouth, has depths of 7 feet through the marked entrance channel and for about 0.8 mile up both its branches. A large yacht haven, on the west side 0.3 mile

above the entrance, has supplies, fuel, and berths. Repairs can be made at a boatyard 0.3 mile up Northwest Branch; marine railway, 70 feet; lift, 20 tons.

**Yorktown**, the historic Revolutionary War town, is on the southwest side of York River 6.7 miles above the mouth. High on the bluff in the southerly part is the **Yorktown Monument**, and a group of buildings is prominent on the shore back of the wharves. The main part of the town is not visible from the river. **George P. Coleman Memorial Bridge**, from Yorktown to Gloucester Point, has twin spans with clearance of 60 feet; the two spans open clockwise simultaneously.

The public wharf at the Yorktown end of the bridge has depths of 6 feet at its face, but depths of 20 feet or more are only 5 feet off of it. The post office is at the wharf. Supplies are available nearby.

**Gloucester Point** is a village at the northeast end of Coleman Bridge. There are several wharves and buildings and some conspicuous oil tanks on the low point, and the red brick building of the Virginia Institute of Marine Science is about 500 yards northeastward. The oil wharf has depths of about 12 feet at the outer end, and an abandoned ferry slip and pier, in poor condition, has about 6 feet at the face. The pier at the Virginia Fisheries Laboratory has about 6 feet at the face.

The **Naval Mine Depot** piers on the southwest side of York River 8 miles above the mouth have depths of about 39 feet at their outer ends. Off the piers is a **restricted area** for mine service testing; see 207.128, chapter 2, for limits and regulations. A **naval anchorage area** begins off the Naval Mine Depot piers and extends upriver about 4 miles; see 202.166, chapter 2, for limits and regulations.

The **Naval Supply Depot** wharves at **Cheatham Annex**, on the southwest side of York River 11.5 miles above the mouth, have depths of 36 feet and more at the southeasterly T-pier and 39 feet and more at the northwesterly T-pier.

**Chart 495.—Queen Creek**, on the southwest side of York River 13 miles above the mouth, has depths of about 5 feet with local knowledge through a marked channel across the flats at the entrance and deeper water through a narrow channel inside for 2.7 miles to **Hawtree Landing**. Gasoline is available at a marina a mile inside the entrance. Stakes on either side of the entrance mark the limits of the State's experimental oyster beds.

**Aberdeen Creek**, on the northeast side of York River 14 miles above the mouth, has a marked channel with a controlling depth of about 4½ feet leading to a turning basin and public landing 0.4 mile above the entrance.

The long wharf at **Clay Bank**, on the northeast side of York River 15 miles above the mouth, is in poor condition; depths at the face are about 15 feet.

**Poropotank Bay**, on the northeast side of York River 22 miles above the mouth, has depths of 5 feet at the entrance; the best water favors the eastern side which is marked by bush stakes. From the entrance, depths of about 5 feet can be carried 4 miles through **Morris Bay**

and **Poropotank River** to **Miller Landing**. There are several other landings along the river. The channel is usually marked by bush stakes, but is crooked and narrow in places and difficult to navigate without local knowledge.

**West Point**, at the junction of Mattaponi and Pamunkey Rivers 29 miles above the mouth of York River, has waterborne commerce in pulpwood, paper products, and petroleum. The town is the terminus of a Southern Railway branch line. The pulp, paper, and paperboard wharves just above the Eltham Bridge have depths of 13 to 17 feet alongside.

At West Point the current velocity is about 1.4 knots in Mattaponi River, and about 1.8 knots in Pamunkey River. Broken-off piling extends off the south side of West Point.

A public pier is at the southeast end of West Point, at the mouth of Mattaponi River. Gasoline is available at an oil wharf with depths of 5 to 15 feet alongside 0.4 mile south of the Lord Delaware Bridge; diesel fuel can be delivered by truck. An oil pier 0.2 mile above the bridge has depths of 18 feet alongside. Supplies can be obtained in town.

**Chart 496.—Mattaponi River** is the easterly of the two tributaries that combine to form York River. Traffic on Mattaponi River consists chiefly of pulpwood. Drafts of vessels using the river above West Point usually do not exceed 10 feet.

Controlling depths in Mattaponi River are as follows: 12 feet to **Courthouse Landing**, 13 miles above the mouth; thence 9 feet for 10 miles to **Locust Grove**; and thence 2 feet to **Aylett**, 32 miles above the mouth.

The channel in Mattaponi River is unmarked and is difficult to navigate without local knowledge. The mean range of tide is 3 feet at West Point and 3.9 feet at Walkerton. Freshets occur at irregular intervals, being more severe in March and April, and have reached a height of 17 feet above low water at Aylett, though this is exceptional; the freshet rise is negligible at and below West Point.

The Lord Delaware Bridge over Mattaponi River at West Point has a swing span with a clearance of 12 feet; the eastern opening is used as there are no fenders on the westerly opening. About a mile above West Point is an overhead power cable with a clearance of 62 feet. The **Walkerton** highway bridge, 24.5 miles above the mouth, has a swing span with a clearance of 6 feet through the southerly opening which has fenders; see 203.245, chapter 2, for drawspan regulations. The **Aylett** highway bridge, 32 miles above the mouth, has a fixed span with a clearance of 20 feet. The minimum clearance of the overhead power cables between the bridges at Walkerton and Aylett is about 48 feet.

**Pamunkey River**, the westerly of the two tributaries that form York River, has many landings along its banks. Traffic on the river consists chiefly of pulpwood; there is a grain elevator platform at **Port Richmond**, 2 miles above

the mouth. Vessels with drafts up to 12 feet navigate the river above West Point.

Controlling depths in Pamunkey River are about 12 feet from the mouth to **Cumberland Landing**, 20 miles above the mouth, thence 8 feet to **White House**, 28 miles above the mouth, and 4 feet to **Manquin Bridge**, 46 miles above the mouth. The mean range of tide is 2.7 feet at **Sweet Hall Landing**, 15 miles above the mouth, and 3.3 feet at **Northbury**, 35 miles above the mouth. Freshets occur at irregular intervals, being more severe in March and April.

Pamunkey River is easy to navigate as far as **Brickhouse Landing**, 16 miles above the mouth; farther up, navigation is difficult without local knowledge. Fresh water is available at some of the landings, and the river water is fresh above Cumberland Landing. Several narrow cutoffs have depths enough for small boats, but their use requires local knowledge. Above **Retreat**, 36 miles above the mouth, the river is covered with floating debris and snags.

The Eltham Bridge over Pamunkey River at West Point has a swing span with a clearance of 10 feet; the southwest opening is preferred, as there are no fenders along the northeast opening. The power cable 1.2 miles above the bridge has a clearance of 60 feet. The railroad bridge at White House has a swing span with a clearance of 4 feet; the easterly opening is used.

**Chart 494.—Mobjack Bay**, which is entered between Guinea Marshes at the shore end of York Spit, and New Point Comfort, 4 miles east-northeastward, includes several tributaries, the most important being East, North, Ware, and Severn Rivers. The bay is obstructed by extensive shoals, but has depths of 22 feet in the entrance and 15 feet for considerable distances into the tributaries. Many of the shoals are marked by lights and buoys.

The only prominent marks in the approach to Mobjack Bay are York Spit Light on the south and the white tower of the abandoned lighthouse on New Point Comfort on the north. The approach channel extends between fishtrap buoys; numerous crab pots exist shoreward of these buoys. Good anchorage, sheltered from all but southerly and southeasterly winds, can be found in the bay. Small craft find safe anchorage in the bight westward of New Point Comfort and in the rivers and creeks. The mean range of tide is 2.3 feet at the entrance.

**New Point Comfort** is the south end of a low, partly wooded island which is separated from the mainland by **Deep Creek**, a crooked and unmarked natural channel which is impassable at low water because of grass. The pile remains of **Bayside wharf**, visible at high water 1.5 miles northwest of New Point Comfort, extend about 0.4 mile channelward.

**Davis Creek**, 1.6 miles northwest of New Point Comfort, has a marked channel with a controlling depth of about 10 feet leading to the public landing in the western arm about 0.8 mile above the entrance. The depth at the face

of the public landing is about 12 feet. Several fishhouses are on shore near the upper part of the creek.

**Pepper Creek**, 3 miles northwest of New Point Comfort, has depths of 4 feet for about 0.7 mile above the entrance. The approach is marked by daybeacons.

**East River**, 5 miles northwest of New Point Comfort, has a marked narrow channel with depths of 10 feet for 3.5 miles above the entrance, and thence 4 feet for another 2 miles to the head. Shoals, sometimes marked by bush stakes, extend for some distance off many of the points above the entrance, but the midchannel is clear.

**Diggs Wharf**, on the east side of East River just inside the entrance is in ruins. Across the river at **Mobjack** is **Philpots Wharf**, which has a depth of 8 feet at the outer face. Fuel and supplies are obtainable. An oil company receiving dock and storage depot are at Mobjack.

**Williams Wharf**, on the northeast side of East River about 2.5 miles above the entrance, has depths of about 8 feet alongside the oysterhouse bulkhead. The oil wharf is used only for discharging petroleum products; a depth of 12 feet is at the outer end. Fuel can be brought in by truck. An oysterhouse and landing are on the western shore opposite Williams Wharf.

**North River**, which empties into the head of the Mobjack Bay from northward, is wide, but has long shoals making off from many of the points. The channel has depths of 12 feet for 4 miles and is well marked; depths of 7 feet can be carried 2 miles farther. **Blackwater Creek** empties into North River 3 miles above the mouth. Depths of 7 feet can be carried for a half mile to a boatyard just inside the entrance of **Greenmansion Cove**; gasoline and some supplies are available. The depth at the face of the dock is 5 feet. Repairs are made; marine railway, 60 feet.

**Ware River**, which flows into the head of Mobjack Bay from northwestward, has depths of 15 feet to the mouth of **Wilson Creek**, on the west side 3 miles above the entrance, and 7 feet for another 2 miles. Long shoals, some of which are marked by lights and daybeacons, extend off many of the points. The only commercial landing on Ware River is the Texas Oil Company wharf, on the east side about 4 miles above the entrance, which has a depth of about 5 feet off the end; fuel and some supplies are available. **Schley**, 0.5 mile inland from the wharf, has a store.

**Severn River**, on the west side of Mobjack Bay, has depths of 18 feet to the junction of **Northwest** and **Southwest Branches**, 8 feet for 1.3 miles in Southwest Branch, and 8 feet for 1.8 miles in Northwest Branch. The most prominent shoals are marked by lights and daybeacons.

A wharf at **Glass**, on the north side of Southwest Branch 1.1 miles above the fork, has depths of about 7 feet to the outer end. Caution is necessary to avoid the 1-foot shoal extending from the point 0.4 mile eastward of the wharf. Gasoline is pumped to the wharf and diesel fuel is trucked in; supplies are available. Repairs are made; marine railway, 90 feet.

**Browns Bay**, a mile south of Severn River, is marked by lights at the entrance and by bush stakes inside. Gasoline is available at a wharf, with a depth of 4 feet at the end, at the head of the bay. A store is at Severn, about a mile westward of the wharf.

**Dyer Creek**, which empties into Chesapeake Bay 2 miles north of New Point Comfort, has depths of 3 feet in the entrance and 4 to 5 feet inside. The creek is bush-staked, but local knowledge is essential. Overhead power cables across the creek have a least clearance of 17 feet.

**Horn Harbor** is entered through a dredged channel marked by lights 2.4 miles northward of New Point Comfort; lights and daybeacons mark the channel in the upper part of the harbor. The controlling depth is about 7 feet in the dredged channel decreasing to about 5 feet at a point 3.5 miles above the entrance. A cluster of submerged piling of a former fishhouse is on the east side of the channel about a mile above the entrance. Traffic consists chiefly of fish, shellfish, and pleasure craft.

Depths of 5 feet are available to the fish wharf at New Point, 0.7 mile above the Horn Harbor entrance. A marina, 3.5 miles above the entrance, has some supplies and gasoline. An 80-foot marine railway can haul out boats for repairs.

**Winter Harbor** is entered through a dredged channel marked by lights and daybeacons 4.3 miles northward of New Point Comfort. The channel with a controlling depth of about 7½ feet leads to a turning basin and public landing 1.5 miles above the entrance. Traffic in the harbor consists chiefly of fish and shellfish.

**Wolf Trap**, the area of broken ground 6 miles northward of New Point Comfort, has numerous shoal spots 5 to 10 feet deep which extend as much as 3 miles from the western shore of Chesapeake Bay. All the shoal area lies in the fishtrap limits. **Wolf Trap Light** (37°23.4' N., 76°11.4' W.), 52 feet above the water, is shown from an octagonal red-brick dwelling with a square tower on a brown cylinder, in depths of 16 feet near the outer end of the shoal area; a fog signal and radiobeacon are at the light. The light is 5 miles due west of a point in the main channel 28.8 miles above the Capes.

**Chart 1223.**—The danger zone of a naval firing range begins about 4 miles north-northeastward of Wolf Trap Light and extends northward to Tangier Sound Light; see 204.46, chapter 2, for limits and regulations.

The control house of a former degaussing range is 5.2 miles east-northeast of Wolf Trap Light; the obstruction is marked by a light and fog signal 0.8 mile westward of the abandoned platform.

**Chart 534.**—**Piankatank River** is 11 miles northward of Wolf Trap Light. The entrance is between **Cherry Point**, at the north end of Gwynn Island, and **Stingray Point**, 2.5 miles to the northward. The entrance point is 45.3 miles above the Virginia Capes. **Stingray Point Light** (37°33.7' N., 76°16.2' W.), 34 feet above the water, is

shown from a skeleton tower with daymark on piles in depths of 6 feet 1.3 miles east of the point; a fog signal is sounded at the light.

Traffic on Piankatank River consists of fish and shellfish, petroleum products, shells, and pulpwood. Drafts of vessels using the river are mostly 6 feet, but drafts up to 11 feet are on record. The river has depths of about 18 feet in the approach from northeastward through a buoyed lane in the fishtraps, 16 feet or more to the fixed bridge 9 miles above the mouth, and 7 feet to Freeport, 13.5 miles above the mouth. Lights and buoys mark the lower 6 miles of the river channel.

The mean range of tide is 1.2 feet in the lower part of Piankatank River. During severe winters, the river is sometimes closed by ice for short periods. Repairs can be made to medium-size vessels in Fishing Bay.

**Jackson Creek**, on the north side of Piankatank River a mile above the mouth, has a dredged entrance channel marked by a light and daybeacons. The controlling depth is about 7 feet in the entrance, with natural depths of 8 to 10 feet inside. Stakes usually define the channel edges. **Deltaville** is at the head of the north arm.

There are places along Jackson Creek where fuel, supplies, and berths can be obtained. The largest marine railway can haul out boats up to 55 feet in length for repairs.

**Hills Bay**, on the south side of Piankatank River 2 miles above the mouth, has general depths of 14 to 20 feet, and is the approach to Queens Creek and Milford Haven.

**Queens Creek**, at the head of Hills Bay, has a bar across the mouth with a depth of 1 foot. Grass makes the entrance impassable at low water. A few broken piles that remain of the wooden jetty on the north side of the entrance are marked at the outer end by a daybeacon.

**Milford Haven**, the strait between Gwynn Island and the mainland to the southwestward, is entered from the head of Hills Bay. Traffic on the waterway consists chiefly of fish and shellfish carried in vessels drawing up to 7 feet. A marked channel with a controlling depth of about 8 feet leads from Hills Bay to natural depths of 15 to 8 feet in Milford Haven.

The jetty on **Narrows Point**, at the north side of the Hills Bay entrance to Milford Haven, is marked by a light. The highway bridge from the mainland to Gwynn Island has a swing span with a clearance of 12 feet in the north opening; see 203.343, chapter 2, for drawspan regulations.

A marina just west of the bridge affords supplies, fuel, and berths; repairs can be made; lift 24 tons. Do not dock on the south end of the fuel pier because of a submerged powerline and shoal water. Gasoline is available at a public landing pier just east of the bridge.

**Callis Wharf** at **Grimstead**, on the Gwynn Island side of Milford Haven 0.7 mile from the jetty, has depths of 9 feet at the face. Gasoline and some other supplies are available. A marine railway on the southeast side of the entrance to **Edwards Creek**, 0.5 mile eastward of Callis Wharf, can haul out boats up to 35 feet in length for repairs.

A wharf at **Cricket Hill**, on the mainland side of Milford Haven 0.8 mile from the jetty, has depths of 8 feet at the face.

Milford Haven can also be entered from Chesapeake Bay at the south end of Gwynn Island. This passage, known as **Hole in the Wall**, has a controlling depth of about 3 feet and is used by small local boats, but it is exposed to heavy seas. A light marks the south side of the entrance.

**Stutts Creek** enters the southern part of Milford Haven from the southwestward. There are depths of 6 feet or more from Milford Haven to a pier on the north side of Stutts Creek, 1.8 miles above the mouth; gasoline and some supplies can be obtained.

**Fishing Bay**, on the north side of Piankatank River 4 miles above the mouth, has depths of 12 to 30 feet. On the east side of the bay is narrow 1-mile long **Stove Point Neck**. A private 700-foot long pier with a depth of 8 feet at the outer end extends westward from the middle of the neck. Repairs can be made at boatyards at the north end of the bay; largest marine railway, 150 feet; lift, 20 tons. Fuel and supplies are available.

**Dixie**, a village on the south side of Piankatank River 9 miles above the mouth, has gasoline and some supplies. The oil wharf has depths of about 10 feet off its outer end. The fixed highway bridge just west of the village has a clearance of 43 feet.

A pier at **Freeport**, on the south side of the river 13.5 miles above the mouth, has depths of 6 feet at the face; some supplies are available.

**Charts 534, 605—SC.—Rappahannock River** flows into the west side of Chesapeake Bay 45.7 miles by channel from the Virginia Capes. Fredericksburg, 93 miles above the mouth, is the head of practical navigation.

Traffic on the river consists chiefly of pulpwood, shellfish and shells, chemicals, and some sand and gravel. Drafts of vessels using the river seldom exceed 11 feet and are mostly 6 feet or less.

**Mileages** on Rappahannock River, such as Mile 15N, Mile 32W, etc., are the nautical miles above the mid-channel point on a line drawn from Stingray Point to Windmill Point. The letters N, S, E, or W following the numbers denote by compass points the side of the river where each feature is located.

The river has natural depths of 15 feet or more to the bridge at Tappahannock, 37.4 miles above the mouth. Above this point, a Federal project provides for dredging of the bars to provide a channel 12 feet deep to Fredericksburg; the controlling depth was about 9 feet, in 1965.

In general, vessels can anchor anywhere near the channel of Rappahannock River where the bottom is soft and the depth suitable. Deep-draft vessels will find good anchorage 3 to 5 miles from the mouth. Carter and Urbanna Creeks are used extensively as harbors by small craft.

The channel from the mouth of Rappahannock River to Tappahannock is comparatively straight, but gradually

decreases in width and leads between shoals that make out from both banks. The principal dangers are marked. Strangers can take a draft of 10 feet to Tappahannock by day with the aid of the chart, but navigation of the narrow, crooked channel farther up requires local knowledge. There are rocks in places on both sides of the channel for 4 miles below Fredericksburg, and the shores should be given a good berth. Strangers can safely carry a draft of 5 feet to Fredericksburg with the aid of the chart.

The mean range of tide is 1.2 feet at the mouth of Rappahannock River, 1.6 feet at Tappahannock, and 2.8 feet at Fredericksburg. The river water is fresh above Port Royal.

The currents follow the general direction of the channel. The velocities throughout the river are usually weak, averaging less than 1 knot at the entrance to 1.3 knots at Tappahannock. Times of slack water and strength of current become later going upriver. These normal conditions are subject to change by winds and changes in drainage flow.

During severe winters, ice closes the river nearly to Tappahannock, but in ordinary winters the channels are usually kept open by the river traffic. Ice sufficient to interfere with navigation of small craft will usually be encountered in January and February, particularly above Port Royal.

**Freshets** occur during the spring and fall, but are of short duration and ordinarily are not dangerous to shipping. The highest level on record was 33 feet above low water at Fredericksburg, but the usual height due to freshets is not more than 9 to 12 feet and only occasionally rises above the wharves. The freshet effect on the water level decreases rapidly below Fredericksburg and is ordinarily negligible 11 miles downriver.

The principal places along Rappahannock River for supplies and small-vessel repairs are Broad Creek, Carter Creek, and Urbanna Creek.

**Chart 534.**—The entrance to Rappahannock River is between Stingray Point and Windmill Point, 45.7 miles above the Capes. This is the **Mile 0.0** for distances on the Rappahannock. The shores on both sides of the entrance are wooded; the two lights, off Stingray and Windmill Points, are the most prominent landmarks.

**Rappahannock Spit** extends southeastward from Windmill Point for about 4.5 miles, and has depths of 4 to 18 feet. **Windmill Point Light** ( $37^{\circ}35.8' \text{ N.}$ ,  $76^{\circ}14.2' \text{ W.}$ ), 36 feet above the water, is shown from a skeleton tower with daymark on piles, in depths of 12 feet on the spit 2.3 miles from the point; a fog signal is sounded at the light.

Depths of 10 feet can be carried across Rappahannock Spit anywhere outside Windmill Point Light. About 0.4 mile outside the light, a buoyed lane that extends southwestward through the fishtraps is a short cut for light-draft vessels approaching the river from northward.

A 6-foot marked channel leads to a marina basin on the south side of **Fleets Island** west of Windmill Point. Some supplies, fuel, and berths are available. Repairs can be made to small craft. See appendix for **storm warning displays**.

**Broad Creek**, Mile 0.7S, is used by oystermen, fishing boats, and yachts. The controlling depth in the marked entrance channel is about 7 feet with natural depths of 9 to 5 feet inside. Boatyards and a marina are inside. Largest marine railway, 110 feet; lift, 20 tons. Supplies, fuel, and berths are available.

At Mile 5.0S, a channel marked by two lights with a controlling depth of about 6 feet leads to a turning basin and wharf 0.5 mile eastward of **Mill Creek** entrance.

**Locklies Creek**, Mile 6.0S, has depths of about 5 feet through a marked entrance with depths decreasing to about 2 feet inside. An overhead power cable near the head has a clearance of 34 feet. There is a marina on the north side near the entrance. The largest marine railway on the south side of the creek can haul out craft up to 45 feet in length for repairs. Some supplies, gasoline, and berths are available.

A dredged channel thorofare between Mill and Locklies Creeks behind **Parrott Island** has depths less than 3 feet.

An inactive fish factory and wharf with depths of 18 feet at the face are on **Cherry Point**, Mile 6.3N. The elevator on the point is prominent.

A fixed highway bridge crosses the river at Mile 7.0; the channel span has a clearance of 110 feet.

**Carter Creek**, Mile 8.3N, is the approach to the villages of **Weems** on the west side and **Irvington** on the east side. Traffic on the creek consists chiefly of petroleum products, sand and gravel, shellfish and shells. Drafts using the creek seldom exceed 11 feet and are mostly 6 feet or less.

Controlling depths of the channels in Carter Creek are about 15 feet in the entrance, 12 feet in Eastern Branch to the wharves at Irvington, and 9 feet in **Carter Cove**, the western branch. The entrance is marked by lights and daybeacons. The mean range of tide is 1.4 feet.

There are several oysterhouses and yacht facilities in Carter Creek. Most vessels go alongside the wharves with depths of about 8 feet, but the creek also is used as an anchorage. Supplies, fuel, and berths are available along the three branches. Most repair facilities are in **Carter Cove**; largest marine railway, 125 feet.

**Corrotoman River**, Mile 10.0N, has depths of 18 feet or more for 4 miles to the junction of Eastern and Western Branches. The river channel is obstructed by shoal spits and middle grounds, but the principal shoals as far as the fork, and for 0.5 mile above in Western Branch, are marked. The mean range of tide is 1.3 feet in the river.

**Whitehouse Creek**, on the west side of Corrotoman River 0.8 mile above the mouth, has depths of 7 feet to the landing at **Bertrand**, on the north side 0.5 mile from the entrance. **Town Creek**, on the west side of Corrotoman River 2 miles above the mouth, has depths of 2 to 4 feet. Gasoline is available near the head; marine rail-

way, 42 feet. **Taylor Creek**, on the east side of Corrotoman River 2.5 miles above the mouth, has depths of 4 to 8 feet. Repairs can be made in a branch on the north side; marine railway, 45 feet.

**Eastern Branch** of Corrotoman River has depths of 13 feet for 1.4 miles, thence 8 feet for 1.5 miles. **Western Branch** has depths of 12 feet or more for 2.5 miles, thence 5 feet for 2 miles. A cable ferry operates, daytime only, from **Ottoman Wharf**, on the southwest side of Western Branch 1.3 miles above the fork, to **Merry Point**, on the opposite side.

**Whiting Creek**, Mile 10.5S, has a marked entrance channel with a controlling depth of about 4 feet.

**Chart 605-SC.—Urbanna Creek**, Mile 14.08, is used by many pleasure craft. The town of **Urbanna** is on the west bank, near the entrance.

A dredged channel with a controlling depth of about 9 feet leads to the wharves just below the bridge. Above this point, depths are 6 feet or more for about 0.7 mile, and small craft can go another mile upstream. The marked entrance is protected by a riprap jetty on the north. The mean range of tide is 1.6 feet.

The wharves at Urbanna have depths of 7 to 14 feet alongside. Complete supplies, fuel, and berths for small craft are available. Repairs are made; largest marine railway, 60 feet; lift, 45 tons.

The highway bridge over Urbanna Creek 0.7 mile above the entrance has a 40-foot fixed channel span with a clearance of 21 feet.

**Robinson Creek**, Mile 14.1W, has depths of 5 feet through the entrance to the head. **Remlik Wharf**, on the south side of the entrance, is about 300 yards long with depths of 6 feet at the outer end.

**Lagrange Creek**, Mile 14.8W, has depths of 7 feet in the entrance and 4 feet for a mile to a boatyard on the southwest side. Marine railway, 50 feet; a machine shop is available. Gasoline and some supplies are obtainable. The wharf has depths of 4 feet at the outer end.

**Greenvale Creek**, Mile 16.9E, has depths of less than 3 feet across the shoals at the entrance. The channel is marked by bush stakes and closely follows the east bank to a landing 0.3 mile above the mouth. During the winter months, with northwest winds, depths less than 1 foot are common. The oysterhouse landings on the west side have depths of 4 feet alongside; gasoline and some supplies are available.

The long wharf 0.6 mile northwest of Greenvale Creek has depths of about 5 feet at the outer end and is in poor condition.

**Parrotts Creek**, Mile 20.0W, has a dredged channel marked by lights and daybeacons from the entrance to the public landing at **Waterview**, 0.5 mile above the mouth. The controlling depth is about 5 feet; a shoal is making into the channel from southward at the first bend. An overhead power cable across the creek just above the mouth has a clearance of 50 feet. Oyster wharves near

the entrance have depths of 5 to 8 feet at their faces; gasoline is available.

**Deep Creek**, Mile 21.0E, has depths of 2 feet across the flats at the entrance and 3 to 5 feet in the several branches. The creek usually is bush-staked. The overhead power cables have minimum clearance of 30 feet. Some supplies and fuel are available at **Boer** on the south side of the creek.

**Mulberry Creek**, Mile 22.4N, has depths of 6 feet in the dredged cut at the entrance, and 4 feet for a mile upstream. A light marks the west side of the entrance, and a shell islet awash at high water is at the inner end of the channel cut. Gasoline and some supplies are obtainable at **Morattico**, on the northwest side of the entrance.

**Lancaster Creek**, Mile 23.5N, has depths of 5 feet in the marked entrance, and thence from 4 to 2 feet for 4 miles to **Woodhouse Landing**. About 2 miles above the entrance, the creek is crossed by an overhead power cable with a clearance of 27 feet. A boatyard on the west side of the entrance has about 3 feet in its basin; some supplies and gasoline are available. Repairs are made; marine railway, 20 feet. Some supplies and gasoline are also available on the northeast side of the peninsula separating Lancaster Creek and **Morattico Creek**; repairs can be made; lift, 10 tons.

A small-boat harbor marked by a light and daybeacon on the ends of the entrance 300-foot jetties is at **Wildwood Beach**, Mile 28.3W. The controlling depth into the harbor is about 5 feet. Some supplies, fuel, and berths are available. A marine railway can haul out boats up to 50 feet in length for repairs; lift, 10 tons.

**Bowlers Rock Light** (37°49.5' N., 76°44.0' W.), 23 feet above the water, is shown from a black skeleton tower on a cylindrical base in depths of 6 feet at Mile 28.5; a fog signal is sounded at the light. **Bowlers Rock**, covered 7 feet and buoyed, is on the east side of the channel 500 yards east-southeastward of the light. A submerged wreck is on the southwest edge of the channel 100 yards north-northeastward of the light; and foul ground extends upriver along the southwest edge of the channel for 1.3 miles from the light.

**Totuskey Creek** is at Mile 30.8N. A marked channel leads to a turning basin below the Totuskey Bridge, 4 miles above the mouth; the controlling depth is about 9 feet. The channel is narrow in places and difficult to follow without local knowledge. A timber-and-bush dike on the northeast side, 2.5 miles above the entrance, is barely visible. **Totuskey Bridge** is a fixed concrete span with a width of 24 feet and a clearance of 10 feet. A good landing on the southeast bank, just below the bridge, has depths of 10 feet at the face and is used by small oil tankers and grain barges. Barges load pulpwood at a landing on the opposite shore, about 0.2 mile below the bridge.

**Piscataway Creek**, Mile 35.0S, has depths of 4 feet in the entrance with greater depths for 5 miles upstream. A highway bridge, 4 miles above the entrance, has a fixed

span with a width of 30 feet and a clearance of 8 feet. Overhead power cables between the entrance and the bridge have a minimum clearance of 16 feet.

**Hoskins Creek** is at Mile 36.8W. A marked channel extends from the entrance to the highway bridge, 0.6 mile above the mouth; the controlling depth is about 5 feet through the entrance channel with deeper water inside to above the public wharf; a grain depot is near the bridge. The highway bridge has a 34-foot fixed channel span with a clearance of 8 feet; the nearby overhead power cable has a clearance of 43 feet. A marina near the first bend has gasoline and some supplies; diesel fuel is trucked in. Repairs are made; a small marine railway and a 3-ton lift are in service here.

**Tappahannock** is at Mile 37.4W. The highway bridge over the river at Tappahannock has a fixed span with a clearance of 35 feet. A wharf just below the bridge has depths of 5 feet at the outer end, but is in poor condition. Just south of this wharf are mooring dolphins of an inactive oil terminal; depths at the dolphins are about 9 feet.

A marked channel with a depth of about 4 feet leads to a small-boat basin at Tappahannock, 0.2 mile above the bridge. Some supplies and gasoline are available; repairs can be made.

**Mount Landing Creek**, Mile 38.4W, has depths of 3 feet across the flats at the entrance and deeper water inside for 3.5 miles. A highway bridge near the entrance has a fixed span with a width of 30 feet and a clearance of 9 feet. The overhead power cable just north of the bridge has a clearance of 18 feet. The creek is used by fishermen.

**Cat Point Creek**, Mile 39.5E, has depths of about 4 feet across the bar at the entrance and deeper water inside for 7 miles. A highway bridge over the entrance has a retractile span with a width of 31 feet and a clearance of 7 feet. An overhead power cable 200 yards above the bridge has a clearance of 21 feet. The cutoff, 1.7 miles above the mouth, has depths of 4 feet. The highway bridge 6 miles above the entrance has a 31-foot swing span with a clearance of 4 feet; it remains in the closed position; see 203.245, chapter 2.

**Occupacia Creek**, Mile 44.2W, has depths of 3 feet across the bar at the entrance and 4 feet for 6 miles up the middle branch; an overhead cable 2.5 miles above the entrance has a clearance of 35 feet, and the overhead cable 6 miles above the entrance has a clearance of about 30 feet. **Bridge Creek**, the eastern branch, has depths of 2 feet to a fixed bridge a mile above the entrance.

**Layton** is at Mile 50.5W. The lower pier has tieup dolphins; the upper pier is in ruins. A pier and tieup dolphins are at **Leedstown**, Mile 52.4N.

**Port Royal** is at Mile 63.5S; the pier is in ruins. The highway bridge from Port Royal to **Port Conway** has a swing span with a clearance of 8 feet; the northeast opening is used. See 203.340, chapter 2, for drawspan regulations.

**Newton Rock**, Mile 91.2S, is 50 feet from shore and almost awash at high tide; the best water is 100 feet off the rock, which is marked by a buoy.

**Fredericksburg**, Mile 93.5W, the historic colonial city, has some trade by water, mostly in motor vessels and barges drawing 8 to 10 feet. Practical navigation terminates at the wharf at the southern end of the city, but small boats can go about a mile farther upriver. Anchorage space is limited, so vessels usually make fast to the wharf, which has 7 feet at the face and is in poor condition. The fixed railroad bridge just above the wharf has a clearance of 37 feet. The fixed highway bridge, 700 yards farther up, has a clearance of 50 feet.

**Chart 534.—Fleets Bay**, just northward of Rappahannock River entrance, is the approach to Little Bay and Antipoison, Tabbs, Dymmer, and Indian Creeks.

Depths of 8 feet can be taken through **Little Bay**, on the south side of Fleets Bay, westward in a narrow channel into **Antipoison Creek** and upstream for over a mile. The bay and creek are used by boats with drafts up to 6 feet. A marina on the north side of the entrance to Antipoison Creek at **Clark Point** has fuel, supplies, and berths for small craft. Repairs can be made; lift, 15 tons. A herring processing plant on the south side of Antipoison Creek 0.6 mile above the entrance has a wharf with depths of 10 feet at the face; another plant directly across the creek has a wharf with depths of 6 feet at the face.

**Tabbs Creek**, on the west side of Fleets Bay 1.5 miles northward of Antipoison Creek, has depths of 2 feet with local knowledge over the bar at the entrance, thence 7 feet or more for about a mile.

**Dymmer Creek**, on the west side of Fleets Bay 2 miles northward of Antipoison Creek, has depths of 13 feet for a mile and 8 feet for another mile. The approach through Fleets Bay is well marked by lights and buoys. The fish factory on the south side of the creek a mile above the entrance has a wharf with depths of 14 feet along the west side; the area along the east side is awash at low water. The boatyard in **Poplar Neck Creek**, just below the fish factory, makes repairs; marine railway, 75 feet. Gasoline is available.

**Indian Creek**, at the northwest corner of Fleets Bay 3 miles northward of Antipoison Creek, has depths of 16 feet in the approach, thence 11 feet for 2 miles above the entrance, and then shoals to 6 feet 0.8 mile farther up. Traffic on the creek consists chiefly of pulpwood, petroleum products, shellfish, and shell. Drafts of vessels using the creek seldom exceed 13 feet and are mostly 6 feet or less. The approach through Fleets Bay and the channel in the creek are well marked.

A country club pier is about a mile above the mouth of Indian Creek, on the northeast side in a cove. Gasoline and some supplies are available. The pier has depths of about 6 feet at the face. **Kilmarnock Landing**, on the west side 2 miles above the entrance, is at the foot of a

paved road that leads 1.5 miles inland to the town of **Kilmarnock**.

Depths of 12 feet are at the dock and boat basin landing; fuel, supplies, and berths are available. There are oil wharves just above and below the basin, and a grain wharf with 10 feet alongside above it. General boat repairs can be made at the landing; marine railway, 45 feet. Depths of 6 feet can be carried for 0.5 mile up the western branch above Kilmarnock Landing to a marine railway that can haul out boats up to 40 feet in length for repairs. A Public Health Service **outpatient office** is at Kilmarnock.

**Dividing Creek** is 8.7 miles north-northwestward of Windmill Point Light. The creek has depths of 14 feet in the approach, thence 13 feet for 1.4 miles above the entrance, and then shoals gradually to depths of 8 feet 1.5 miles farther up. The creek is used by boats with drafts of 5 feet or less. The approach between the shoals off the entrance is well marked by lights and buoys. The overhead power cables over the upper branches have a least clearance of 29 feet.

**Chart 1223.**—In addition to the danger zone of a naval firing range that extends from north of Wolf Trap Light to south of Tangier Sound Light, previously described, several danger areas are in Chesapeake Bay between Windmill Point Light and Smith Point Light.

**San Marcos Wreck**, 10.5 miles northeast of Windmill Point Light, is covered by about 20 feet of water, but the depth over it is subject to change, due to the shifting steel.

The **danger zone** of a naval guided missiles test operations area is centered 14.5 miles northeasterly of Windmill Point Light; see **204.44**, chapter 2, for limits and regulations. Sunken ships and other obstructions are within the area.

**Chart 534.—Great Wicomico River**, on the west side of Chesapeake Bay 13 miles northward of Windmill Point Light, is entered between **Dameron Marsh** and **Bull Neck**, 1.7 miles to the northward. The principal marks for the entrance are Great Wicomico River Light and the buildings at Fleeton, on Bull Neck.

**Great Wicomico River Light** (37°48.2' N., 76°16.1' W.), 42 feet above the water, is shown from a white hexagonal house with brown piles and roof, in depths of 9 feet 0.6 mile southeast of Bull Neck; a fog signal is sounded at the light. The light is 4.5 miles due west of a point on the main channel 56 miles above the Capes.

Great Wicomico River has depths of 17 feet or more for 5.5 miles above the entrance, and thence 9 feet or more for 3 miles. The river is navigable for small craft for another 2 miles. Vessels seeking shelter usually anchor in depths of 15 to 20 feet off and in the entrance to Cockrell Creek. Fishtraps usually will be found on the shoals at the entrance; the approach can be made on a due west course between the buoys marking the trap areas.

The channel in Great Wicomico River is marked by lights for 4 miles from the entrance. The mean range of

tide is 1.1 feet at the entrance. Ice does not close the river to navigation except in severe winters, and then only for brief periods; Cockrell Creek is considered a secure harbor from ice.

**Cockrell Creek**, on the northeast side of Great Wicomico River a mile above the mouth, has depths of 15 feet for 1.5 miles above the entrance, then shoals gradually to 6 feet a mile farther up. A menhaden fleet bases a mile up the creek. Traffic consists chiefly of fish, shellfish, and petroleum products. Numerous fish factories operate along its shores. Drafts of vessels are mostly 12 feet and under, but drafts up to 14 feet use the creek. There are depths of 8 to 15 feet at the faces of the wharves.

**Fleeton** is on the southeast side of the entrance to Cockrell Creek. The dock of a marine service station has 14 feet at its face; fuel and supplies can be obtained.

**Reedville**, on the east side of Cockrell Creek 1.5 miles above the entrance, is a **customs** port of entry at which marine documents are issued; the town has a Public Health Service **outpatient office**. Fuel and supplies are available.

The boatyards along Cockrell Creek can handle vessels up to 100 feet in length.

**Mill Creek**, on the southwest side of the river 1.5 miles above the entrance, has depths of 12 feet or more through a crooked channel across the flats and for a mile above the entrance, thence 8 to 10 feet for another mile. A grain wharf is 1.5 miles above the mouth.

**Cranes Creek** is on the west side of Great Wicomico River 1.5 miles above the mouth. The entrance channel marked by daybeacons has a controlling depth of 5 feet; greater depths are inside. Several small privately owned wharves along the banks of the creek are used by boats drawing up to 3 feet.

**Mila**, on the west side of Great Wicomico River 3.5 miles above the mouth, has a landing with a depth of 5 feet at the outer end.

The highway bridge over Great Wicomico River 6 miles above the mouth has a swing span with a clearance of 9 feet in the north opening; see **203.245**, chapter 2, for drawspan regulations. The overhead power cable 50 yards above the bridge has a clearance of 40 feet. There are small craft facilities on both sides of **Glebe Point** at the north end of the bridge. Gasoline and supplies are available. A marine railway can haul out boats up to 50 feet in length for repairs. Gasoline is also obtainable at a yacht basin on **Ferry Point**, 0.7 mile east of the bridge.

## 12. CHESAPEAKE BAY, POTOMAC RIVER

**Charts 557 to 560.**—Potomac River flows into the west side of Chesapeake Bay 68.4 miles above the Virginia Capes. The river is the boundary between Virginia on the west and Maryland on the east, and at the head of tidewater on the Maryland side is the city of Washington, D.C., the Nation's Capital.

Hains Point at the junction of Anacostia River and the Washington and Virginia Channels is 94.6 miles above the mouth of the Potomac. The head of tidewater navigation is at Chain Bridge, Washington, 101 miles above the mouth. The widest point of the river, 6.4 miles, is 11 miles above its mouth (see chart 557).

**Mileages** on Potomac River in this chapter, such as Mile 13E, Mile 41W, Mile 51N, etc., are the nautical miles above the midchannel entrance point which is 4.8 miles northwest of Smith Point on a line between Smith Point and Point Lookout; that point is 68.4 miles above the Capes. The letters N, S, E, or W following the mileage numbers denote by compass points the side of the river where each feature is located.

Traffic on the river consists chiefly of petroleum products; sand, gravel, and crushed rock; and some newsprint and fertilizers. Drafts of vessels navigating the river usually do not exceed 20 feet.

**Channels.**—The Federal project depth is 24 feet for Potomac River from the mouth to Hains Point. There are natural channel depths of 38 feet or more to Ragged Point, 20 miles above the mouth; thence the controlling depth is about 21 feet to Hains Point.

**Anchorage.**—Vessels bound up or down the river anchor anywhere near the channel where the bottom is soft; vessels sometimes anchor in Cornfield Harbor or St. Marys River (see chart 557). Above Alexandria, vessels usually go to the wharves; there is little or no anchorage for anything but small craft. Near the mouth of the river, small craft can find secure anchorage in most of the tributaries; Smith Creek (see chart 557) is said to have best protection from all winds.

**Fishtrap areas** extend upriver from the mouth to St. Clements Island. Limits of the areas are marked by buoys and are shown on charts 557 and 558.

Pile structures with white square daymarks and a black rectangular center with identifying letters and numbers are maintained by the Potomac River Fisheries Commission on both sides of the river at the entrances to many of the bays and rivers.

**Danger zones.**—Potomac River is used extensively by the military establishments for testing operations and gunnery practice. Limits of the danger areas and regulations governing them are given in chapter 2.

**Tides.**—The mean range of tide is about 1.3 feet at the mouth of the river, 1.9 feet in the vicinity of St. Clements Island, 1.1 feet at Maryland Point, 1.7 feet at Indian Head, and 2.9 feet at Washington. Above Washington, the river is tidal as far as Chain Bridge. The tides are influenced by the force and direction of the wind and by freshet conditions, and may at times vary considerably. Daily predictions for Washington are given in the Tide Tables.

**Currents.**—The currents in Potomac River follow the general direction of the channel. The velocities vary throughout the river and are influenced by wind and freshets. There may be little or no flood current during freshets.

The current velocity is weak in the lower part of the river between the entrance and Piney Point, averaging less than 1.0 knot.

**Ice.**—During severe winters the tributaries of the Potomac are closed by ice and the river is frozen over to Cedar Point; the upper part is then closed to navigation. During ordinary winters the powered vessels plying the river keep the channel open.

When threatened by icing conditions, certain lighted buoys may be replaced by lighted ice buoys with reduced candlepower or by unlighted buoys, and certain unlighted buoys may be discontinued; see Light List.

**Freshets** occur at irregular intervals, but usually do not interfere with navigation below Alexandria unless accompanied by floating ice.

**Pilotage** is compulsory on the Potomac for foreign vessels and American vessels in the foreign trade. Virginia pilots take vessels to Virginia ports and Maryland pilots take vessels to Maryland ports; pilots from either State take vessels to Washington.

**Chart 557.**—Potomac River is entered between Smith Point and Point Lookout; the width of entrance, normal to the channel, is about 5 miles.

The fishtrap areas in the lower river are marked by buoys and are shown on the chart. **Danger zones** for military testing operations extend from the mouth of the river to the upper limits of the chart; limits and regulations are given in 204.40, chapter 2.

**Smith Point**, the southerly entrance point, is low and inconspicuous. A shoal area that extends eastward from the point has depths as little as 8 feet 2 miles from shore; a buoy marks the northeast edge of the shoal.

**Smith Point Light** (37°52.3' N., 76°11.0' W.), 52 feet above the water, is shown from a white square tower and octagonal dwelling on a brown cylindrical pier about 2.5

miles east-by-south of the point; a radiobeacon and fog signal are at the light. There are depths of 13 feet 200 yards east of the light. The light is 1.5 miles due west of a point on the bay ship channel 60.7 miles above the Capes.

**Little Wicomico River** empties into Potomac River at Smith Point. The controlling depth is about 6 feet for 4 miles upriver from the jettied entrance. Lights mark the dredged entrance channel and daybeacons mark the upper reaches. The river is used by local fishermen and pleasure craft.

Fuel, berths, and some supplies are available at a marina in **Tab's Creek**, about a mile inside the entrance of Little Wicomico River. **Sunnybank**, 1.5 miles above the entrance, has gasoline and some supplies. A vehicular ferry crosses the river at the village. Repairs can be made at boatyards in the upper part of the river. The largest marine railway can haul out boats up to 70 feet in length.

**Point Lookout**, the northerly entrance point of Potomac River, is low, but is well marked by an abandoned light-house, a water tank, and several buildings. The shoal that extends about 1 mile southward from the point is marked by **Point Lookout Light** ( $38^{\circ}01.6' N.$ ,  $76^{\circ}19.3' W.$ ), 41 feet above the water, shown from a skeleton tower with daymark on pile structure; a fog signal is at the light.

**Cornfield Harbor**, just inside Point Lookout, is sheltered from northerly and northeasterly winds; vessels bound up and down the bay frequently use it as an anchorage for the night. The shoaling is gradual, except off **Cornfield Point** and at the south end of the shoal that extends southward from Point Lookout; at these places the hard sand bottom drops off abruptly. An 18-foot spot and rocks covered 17 feet are about 0.7 mile westward from Point Lookout, and a 10-foot spot lies between them and the Point Lookout shore. A wharf on the west side of the point extends 330 feet out from shore and has a depth of 11 feet at its outer end.

**Coan River**, Mile 7.8S, has depths of 13 to 7 feet for 4.5 miles to within 0.5 mile of the head. The river is used mostly by local oyster and fish boats. A 500-yard lane in the approach is kept clear of fishtraps; the initial course through the lane is  $230^{\circ}$ . The entrance to Coan River is marked by buoys and a light, and is easy to navigate; the channel inside is marked at the critical points by daybeacons and bush stakes. The mean range of tide is 1.4 feet at the entrance.

**Kingscote Creek**, on the north side of Coan River 0.6 mile above the mouth, has depths of 8 feet for most of its 1-mile length. A shoal extends halfway across the entrance from the point on the west side. **Lewisetta**, on the east side 0.3 mile above the entrance, has a store and pier where fuel and some supplies are procurable.

The **Glebe**, on the west side of Coan River 0.7 mile above the mouth, has depths of 9 to 13 feet to the forks 1.5 miles above the entrance. The channel in The Glebe is clear except for a shoal that extends well off from the point on the south side 0.6 mile above the entrance.

**Stevens Point** is on the west side of Coan River a mile above the mouth. The boatyard on the south side makes repairs; marine railway, 50 feet. Gasoline is available.

The wharf at **Bundick**, on the west side of Coan River 3.4 miles above the mouth, has depths of 9 feet at the outer end, but is in poor condition; gasoline and some supplies are obtainable at a nearby store. **Coan wharf**, directly across the river from Bundick, is in ruins. The overhead power cable from Coan to Bundick has a clearance of 60 feet.

**Smith Creek**, Mile 8.5N, is used by many small fishing and pleasure boats, and has the best protection along this part of the river from all winds. The depth over the bar is about 9 feet, and the same depth can be carried 1.5 miles above the entrance light into the two main branches. The entrance is well marked. The lane through the fishtraps can be navigated on a course of  $355^{\circ}$ .

**Wynne**, on the east side of the entrance to Smith Creek, has fish wharves, with depths of 5 to 10 feet at their outer ends, and marinas; supplies, fuel, and berths are available. Largest haulout capacities for repairs are: railway, 150 feet; lift 20 tons.

**St. Marys River**, Mile 9.7N, is 2 miles wide at the entrance and about 600 yards wide at St. Marys City, 5.5 miles up. The channel has depths of 20 feet or more to St. Marys City, then shoals gradually to 12 feet at **Martin Point** and to 8 feet at **Tippity Wichity Island**, 8 miles above the mouth. St. Mary's River is sometimes used as an anchorage by the deeper draft vessels seeking shelter from heavy gales, but small boats prefer Smith Creek. The river has very little traffic other than local fishing craft. The course through the fishtraps off the entrance is  $345^{\circ}$ . The mean range of tide is about 1.5 feet.

**St. George Island**, on the west side of the entrance to St. Marys River, is long, low, and sparsely wooded. The island is thickly settled, mostly by oystermen and fishermen, and is used to some extent as a summer resort. **St. George Bar** extends 1.3 miles southeastward from the island and is marked at its outer end by a lighted buoy.

A marked channel with a controlling depth of about 5 feet leads to fishing piers and a turning basin inside **Island Creek** at the southeast end of St. George Island.

**St. George Creek**, which joins St. Marys River along the northeast side of St. George Island, has a narrow, crooked, marked channel with depths of 10 feet or more for 3.5 miles. The creek is used extensively by oystering and fishing boats, and by pleasure craft.

A marked passage with a controlling depth of about 6 feet enters St. George Creek at the north end of St. George Island. There are spoil banks on each side of the Potomac River end of the passage. The fixed bridge over the passage has a width of 35 feet and a clearance of 17 feet.

The town of **Piney Point**, on the west side of St. George Creek 2.5 miles above the mouth, has several wharves with depths of 5 to 8 feet; a marina and yacht club are in **St. George Harbor**. Supplies, fuel, and berths are available. Repairs can be made; marine railway, 60 feet.

At **Morgan Point**, 3.5 miles above the mouth, is a repair yard; marine railway, 40 feet. Gasoline is available.

**St. Marys City**, at **Church Point**, on the east side of St. Marys River 5.5 miles above the mouth, was the original capital of Maryland. Few traces of the original town remain, but the statehouse was reconstructed in 1934 from the ruins of several other buildings nearby. A landing on the south side of the point has a depth of about 9 feet at the outer end.

**Yeocomico River**, Mile 10.2S, has depths of 19 to 12 feet to the forks 1.4 miles above the entrance. Lights mark the channel to the forks and bush stakes mark the edges of the tributary channels. The initial course through the fish stakes off the entrance is  $244^{\circ}$ . The mean range of tide is 1.3 feet at the entrance and 1.2 feet at Kinsale.

**West Yeocomico River**, the west fork, has depths of 13 to 7 feet to **Kinsale**, on the southwest side 1.7 miles above the entrance. Fuel and some supplies are available inside the cove on the north side of the river east of **Allen Point**, 0.4 mile above the mouth. Repairs are made; marine railway, 50 feet. The fixed highway bridge at Kinsale has a width of 29 feet and a clearance of 8 feet. The cannery landing has depths of 6 feet at the outer end. The bulkhead wharf just southward has depths of 10 feet alongside; the grain elevators on the wharf are prominent. Some supplies and fuel are available at Kinsale.

**South Yeocomico River**, the south fork, has depths of 13 to 7 feet to **Lodge**, on the west side of **Lodge Creek** 2 miles above the entrance of the south branch. The cannery wharf at **Mundy Point**, on the west side of the entrance, has depths of 6 feet at the wharf. Several small landings on the south side of the point have depths of 9 feet at their outer ends. Some supplies and fuel are available.

**Harryhogan Point** is on the west side of South Yeocomico River a mile south of the entrance. The marine railways at the settlement can handle vessels up to 80 feet in length. The north landing at the cannery has depths of 9 feet alongside, and the south landing has depths of 5 feet. The lumber-mill landing 0.2 mile southwestward has depths of 7 feet alongside. Fuel and some supplies are available.

**Piney Point** is at Mile 15.9N. An abandoned lighthouse tower and a Coast Guard station are on the point. The Coast Guard wharf and the small private landings east of Piney Point have depths of about 5 feet at their outer ends. Gasoline and some supplies are available at a dock about a mile northeast of the point.

The prominent T-shaped oil terminal that extends 1,100 feet southwestward from Piney Point has a 684-foot outer face, with depths of about 35 feet alongside, and is marked by private lights.

**Chart 558.**—Limits of the fishtrap areas that extend upriver as far as St. Clements Island are marked by

buoys and are shown on the chart. **Danger Zones** for military testing operations extend the length of the chart; limits and regulations are given in **204.40**, chapter 2.

**Herring Creek**, Mile 18.7E, has a jettied entrance and a marked channel with a controlling depth of about 6 feet; depths inside are 7 to 4 feet. Gasoline and some supplies are available at a marina on the south side of the entrance; a mechanic is on duty. A fish dock with 6 feet at the outer end is just east of the marina fuel pier. See appendix for storm warning display.

A shoal extends 0.5 mile offshore from **Ragged Point**, at Mile 19.1S. A light and a fog signal are near the outer edge of the shoal.

**Lower Machodoc Creek**, Mile 21.7S, has depths of 15 to 11 feet for 2 miles, thence the depths decrease to 4 feet at a point 4 miles above the entrance. The critical points are marked as far as the narrows 2.2 miles from the entrance; the shoals are usually bush-staked.

**Branson Cove**, on the east side of Lower Machodoc Creek a mile above the entrance, has a marked channel with a controlling depth of about 7 feet leading to a boat basin. **Coles Point**, the village along the north shore of the cove, has wharves with depths of about 6 feet at the outer ends. Some supplies and fuel are available; repairs are made; marine railway, 50 feet. There is a large oyster-packing plant on the south side of the entrance to the cove.

Gasoline can be obtained at **Tidwells** on the west side of the narrows 2.2 miles above the entrance to Lower Machodoc Creek. The overhead power cable 3.8 miles above the entrance has a clearance of 30 feet.

**Nomini Bay**, Mile 25S, has depths of 20 to 15 feet and is the approach to Nomini Creek and Currioman Bay. The shoaling is abrupt on the east side of the bay and gradual on the west side.

**Nomini Creek** has a controlling depth of about 6 feet to the second bridge, 5 miles above the entrance, thence 3 feet for 0.5 mile. There is a long jetty on the east side of the entrance to the creek and the narrow entrance channel is marked. The mean range of tide is about 2 feet. Traffic on the creek consists chiefly of seafood and fertilizer.

The highway bridge at **Nomini**, 3.7 miles above the entrance, has a swing span 39 feet wide in the west opening, and a clearance of 5 feet; the east opening is not used. The fixed highway bridge at **Prospect Hill**, 5 miles above the entrance, has a 30-foot span with a clearance of 10 feet.

Some supplies and fuel are available at Nomini. The landings have depths of about 7 feet at their faces.

**Currioman Bay** is separated from the west side of Nomini Bay by **Hollis Marsh**, a narrow 2-mile-long spit which is wooded in the middle. Currioman Bay has depths of 7 to 10 feet in the entrance from the head of Nomini Bay and in most of the area back of Hollis Marsh; the entrance from Potomac River at the northwest end of Hollis Marsh has depths of only 2 to 3 feet. The entrance from Nomini Bay is marked by daybeacons

which should not be confused with the markings for Nomini Creek entrance, just eastward.

**Breton Bay**, Mile 25.2N, is a favorite anchoring ground for yachts. Commercial traffic consists chiefly of petroleum products. Drafts using the bay are mostly 6 feet or less, but occasionally vessels drawing up to 11 feet come inside.

The bay has depths of 15 to 11 feet for 4.5 miles, thence about 5 feet through a dredged cut to Leonardtown, 5 miles above the entrance.

A 1,000-yard lane extends through the fishtraps off the entrance to Breton Bay; the initial course through the lane is  $352^\circ$ . The shoal that extends eastward from Heron Island Bar to the Breton Bay approach is marked by an obstruction buoy, and another shoal that extends southwestward from **Huggins Point**, on the east side of the entrance, is marked by a light. Buoys and lights mark the bay channel to within 0.5 mile of Leonardtown. The mean range of tide is 1.7 feet at Leonardtown.

**Combs Creek**, on the north side of Breton Bay 1.5 miles above the mouth, has depths of about 6 feet to the landings. The narrow entrance is between shoal spits marked by stakes. Fuel is available. The marine railways on the west side of the creek can haul out boats up to 50 feet in length for repairs. An overhead power cable 0.2 mile above the mouth has a clearance of 50 feet.

A channel with a controlling depth of 6 feet, marked by piles, leads into the bight just southwestward of the entrance to Combs Creek. The boatyard in the bight can haul out vessels up to 70 feet in length for repairs. Gasoline and some supplies can be obtained; diesel fuel can be trucked in.

**Lovers Point** is on the east side of Breton Bay 3 miles above the mouth. A bar with depths of less than 1 foot extends 500 yards northwestward from the point and is marked at its outer end by a light.

**Buzzard Point** is on the west side of Breton Bay 4.5 miles above the mouth. A light marks the outer end of a bar that extends off the point.

**Leonardtown**, on the north side of Breton Bay 5 miles above the mouth, has some supplies and gasoline at the wharf; slips are on the east side. An oil pier is west of the wharf.

**St. Clements (Blakiston) Island** is at Mile 27.0N. Near the south end of the thinly wooded island is a prominent cross which commemorates the first Catholic mass by English settlers in America on March 25, 1634. Shoals extend from the island in all directions. The long wharf near the north end has a depth of about 16 feet at the outer end.

**Heron Island Bar**, about 1 mile eastward of Clements Island, is an extensive shoal area mostly covered at low water; the bar is marked at the eastern and western ends by buoys.

**St. Clements Bay**, north-northeastward of St. Clements Island has three entrances. The eastern entrance, between Heron Island Bar and the mainland, is by way of

the Breton Bay lane through the fishtraps; this entrance has depths of 20 to 16 feet and is easily followed in the daytime. The middle entrance, between Heron Island Bar and St. Clements Island, has depths of 15 feet or more and is approached through a 500-yard lane in the fishtraps on an initial course of  $352^\circ$ ; this entrance is narrow and crooked, but is marked by a light and buoys and is easily followed in the daytime.

**Dukeharts Channel**, between St. Clements Island and the mainland 0.5 mile to the north-northwestward, has a controlling depth of 5 feet in the marked channel between St. Clements Bay and the Potomac River.

St. Clements Bay has channel depths of 14 feet for 3 miles, then shoals gradually to 8 feet 5 miles above the entrance. The mean range of tide is 1.8 feet.

**St. Patrick Creek**, on the west side of St. Clements Bay 0.5 mile above the mouth, has a marked entrance channel with a controlling depth of about 7 feet. Depths decrease to 2 feet toward the head. The creek is much frequented by fisherman, oystermen, and pleasure craft. There are several small-craft facilities along the creek above **Palmers**, on the south side 0.4 mile above the entrance. Fuel, supplies, and berths are available. The largest marine railway can haul out boats up to 65 feet in length for repairs.

**Canoe Neck Creek**, on the west side of St. Clements Bay 1.5 miles above the mouth, has depths of 11 feet in the entrance, then shoals gradually to 6 feet a mile upstream. The landings at **Morris Point**, on the south side just above the entrance, have depths of 4 to 12 feet at the outer ends; fuel and some supplies are available. The marine railways can haul out boats up to 65 feet in length for repairs.

**St. Catherine Sound**, Mile 29.0N, has depths of 5 to 9 feet behind **St. Catherine Island**. There are two entrances, one at the northwesterly end and the other at the southeasterly end; each is marked and has controlling depth of about 4 feet. The wharves along the shore of the sound are privately owned.

**Whites Neck Creek**, on the north side of St. Catherine Sound, has depths of 4 feet in the entrance and 6 to 2 feet inside; an overhead power cable crossing the entrance has a clearance of 40 feet. A marine service pier on the west side just inside the entrance has depths of 4 feet at the outer end; fuel and some supplies are available. The marine railway just upstream can handle boats up to 45 feet in length for general repairs.

**Wicomico River** is at Mile 31.0N. Its commercial traffic consists chiefly of shellfish. Drafts of vessels using the river are mostly 6 feet or less.

The river is characterized by long spits, with little depth and abrupt outer ends, which extend to the edges of the channel in several places. The entrance is 1.3 miles wide between **St. Margaret Island** on the east and **Cobb Island** on the west. **Cobb Point Bar**, which extends a mile southeastward from the island, is marked at the outer

end by a light; the shoal extending 0.6 mile westward from St. Margaret Island is marked by a buoy.

The Wicomico River channel has depths of 40 to 12 feet for 5 miles, thence 6 feet with local knowledge for 3 miles, and then decreasing to 3 feet to the head, 11 miles above the mouth. The channel is marked at the most critical points for about 8 miles. The mean range of tide is 1.9 feet.

**Neale Sound**, on the west side of Wicomico River between Cobb Island and the mainland, has depths of 7 to 12 feet and affords secure anchorage for small boats. Both entrances are marked by lights and the critical part of the channel at the northwest end is marked by day-beacons; the aids are numbered from Wicomico River westward to Potomac River. The controlling depth in the east dredged cut is about 7 feet, while the west cut has 6 feet if the east side of the Potomac River reach is followed. The highway bridge over Neale Sound has a 34-foot fixed span with a clearance of 18 feet.

Gasoline, some supplies, and berths are available on both sides of Neale Sound at the bridge. Repairs are made; largest marine railway, 60 feet.

**Bushwood** is on the east side of Wicomico River 1.5 miles above the mouth. Fuel and some supplies are obtainable.

**Charleston Creek**, on the west side of Wicomico River 3 miles above the mouth, is used by oyster boats as an anchorage.

From Nomini Bay to within 2 miles of Popes Creek, the Virginia shore of Potomac River is backed by high ground. Along this stretch are **Nomini Cliffs**, **Stratford Cliffs**, **Horsehead Cliffs**, and the valleys between them.

**Popes Creek**, Mile 33.5S, leads to Wakefield and the **George Washington Birthplace National Monument**. The controlling depth is about 1½ feet in the entrance, and a stone jetty 2 feet high extends 200 feet offshore from the point on the north side. Current velocity up to 4.5 knots has been reported in the entrance.

**Mattox Creek**, Mile 36.1S, has depths of 7 to 5 feet in a marked narrow channel for 2 miles to **Fox Point**, then the depths decrease to 3 feet at the fixed concrete highway bridge, 4 miles above the entrance. Gasoline and some supplies are available south of Fox Point.

**Colonial Beach**, Mile 36.5S, is a summer resort just northwest of Mattox Creek. The largest of the wharves on the river side of the town is the municipal 450-foot T-pier 1.2 miles above the south end, that has 8 feet at the outer end.

**Monroe Creek**, back of Colonial Beach, is entered between **Gum Bar Point**, at the south end of the town, and **Sebastian Point**, 150 yards westward. The creek is used extensively as an anchorage. The dredged channel marked by lights and daybeacons from the entrance of the creek to **Robins Grove Point** at Colonial Beach has a controlling depth of about 6 feet.

Fuel, supplies, and berths are available at Colonial Beach. The largest haul-out facilities for repairs are:

railway, 65 feet; lift, 30 tons. The landings in the basin have depths of 7 feet at their outer ends. A yacht club is on the eastern side of the entrance to Monroe Creek.

**Chart 556.—Potomac Beach** is at Mile 38.8W. A fish dock and an oil wharf are the only usable landings. Depths of 7 to 12 feet can be taken to the landings. Gasoline and some supplies are obtainable.

**Rosier Creek**, entered just westward of Potomac Beach, has depths of 2 feet in the entrance and 5 to 3 feet for a mile upstream. The creek has no wharves and is little used.

**Upper Machodoc Creek** is at Mile 40.2W. The **United States Naval Weapons Laboratory** is at **Dahlgren**, on the north side of the entrance to the creek, but also occupies land for a considerable distance along the south shore; limits of the **danger zones** and regulations governing them are given in 204.40, chapter 2. The tanks and radio masts at Dahlgren are prominent.

The well marked main channel from Potomac River to the basin and wharves at Dahlgren has a controlling depth of about 10 feet. A buoyed cutoff channel to the southward has a controlling depth of about 8 feet. The mean range of tide is 1.6 feet.

Above Dahlgren, Upper Machodoc Creek has depths of 7 to 5 feet to **Little Ferry Landing**, 3.5 miles above the entrance, thence 7 to 2 feet for another 2 miles to **Milford Landing**. Only small piers are found along the banks.

**Williams Creek**, on the north side of Upper Machodoc Creek a mile above the mouth, has depths of 4 to 2 feet to the highway bridge a mile above the entrance. An overhead power cable 0.6 mile above the entrance has a clearance of 24 feet.

Some supplies and gasoline are available at a marina on the north side of the entrance to Williams Creek; some repairs can be made. Gasoline and a few supplies can also be obtained 0.6 mile above the entrance.

**Lower Cedar Point** is at Mile 42.1E. A light is shown from a white skeleton tower on piles in depths of 3 feet on the west edge of the main channel 0.7 mile westward of the point; a fog signal is at the light.

**Morgantown** is on the south side of Lower Cedar Point. There are strong cross currents south of the point. The landings that remain intact are suitable only for small boats. Depths of 6 feet can be taken to the landings by passing eastward of the shoal south of Lower Cedar Point; the south end of the 0.7-mile-long shoal is marked by a light. Gasoline and some supplies can be obtained at Morgantown.

**Chart 559.—Potomac River Bridge**, Mile 43.4, has a fixed channel span with clearances of 135 feet for a width of 480 feet and 105 feet for a width of 700 feet. The centerline of the main span has a fog signal and is marked by a flashing red aviation obstruction light and by a fixed green light surmounted by three fixed white lights vertically 15 feet apart. The bridge also is marked by fixed red lights on the main trusses and approaches.

There is a small-boat basin and marina just above the Potomac River Bridge on the Maryland side. The entrance channel and basin have depths of about 8 feet. Some supplies, fuel, and berths are available. Minor repairs can be made; lift, 20 tons.

A danger zone for military testing operations extends 4 miles upriver from the bridge; see 204.40, chapter 2, for limits and regulations.

**Persimmon Point** is at Mile 44.5W. A 5-foot shoal on the west edge of the channel 0.6 mile southeastward of the point is marked by a light.

**Popes Creek**, Mile 45.4E, is not navigable. The village of **Popes Creek** is the terminus of a railroad from Baltimore and Washington. There is a depth of about 9 feet to the railroad wharf. Gasoline and some supplies are available in small quantities. A buoy marks a 3-foot spot just south of the wharf.

Between Popes Creek and Upper Cedar Point, 4.5 miles upriver, the Maryland shore of Potomac River bends northward about 2 miles to form **Port Tobacco River Flats**, which have shoal spots of 3 to 5 feet but generally navigable depths of 7 to 10 feet. **Port Tobacco River**, at the head of the bight, has depths of 7 feet for 1.6 miles and thence 5 to 3 feet for another 1.3 miles. Private seasonal buoys mark the channel. The mean range of tide is 1.5 feet.

**Chapel Point**, on the east side of Port Tobacco River 1.2 miles above the mouth, is a summer resort. **Port Tobacco**, 4.4 miles above the entrance, is now the head of practical navigation. A marina at the town has some supplies and gasoline. Minor repairs can be made; lift, 10 tons.

**Mathias Point** is at Mile 47.7S. A light is shown from a skeleton tower on piles in depths of 3 feet on the south edge of the main channel 0.3 mile northward of the point; a fog signal is at the light.

**Upper Cedar Point**, at Mile 50.0N, is marked by a light shown from a skeleton tower on piles in depths of 3 feet on the north edge of the channel 0.5 mile southeastward of the point. A fog signal is at the light; give the light a berth of at least 200 yards.

**Nanjemoy Creek**, Mile 51.0N, has a controlling depth of about 4 feet in a privately marked channel to a point about 4 miles above the entrance.

**Metomkin Point** is at Mile 53.1S. A light, in depths of 1 foot 0.5 mile off the point, marks the shallowest part of a shoal area along the southeast edge of the channel.

**Maryland Point Light** (38°21.0' N., 77°11.9' W.), Mile 55.8S, 42 feet above the water, is shown from a skeleton tower on piles in depths of 9 feet on the south edge of the Potomac River channel 0.7 mile southeastward of **Maryland Point**. A fog signal is at the light. Other shoals east and west of the light are marked by buoys.

Gasoline and some supplies can be obtained at **Fairview Beach**, Mile 57.4S. Depths to the fuel pier are about 4 feet. Minor repairs can be made; lift, 10 tons.

**Potomac Creek**, Mile 58.5S, is used only by small motor-boats. **Bull Bluff**, on the south side of the entrance, is

high and wooded. The creek has depths of 7 feet in the entrance, thence 3 feet for 2 miles. The best water favors the south side of the entrance.

**Aquia Creek**, Mile 60.4W, has depths of 4 or 5 feet to the railroad bridge, and thence 2 feet to **Coals Landing**, 5 miles above the mouth; the entrance is marked. The mean range of tide is 1.2 feet. A fixed railroad bridge, 3 miles above the entrance, has a width of 46 feet and a clearance of 26 feet. Gasoline and some supplies can be obtained on the south side of the creek and above the bridge. Minor repairs can be made below the bridge; lift, 8 tons.

**Smith Point**, Mile 61.5E, is marked by a light. **Clifton Beach** is on the point. The broken piling of a former landing 300 yards south of the light is nearly awash at high water.

There is danger of striking submerged hulks in the mile-wide former restricted anchorage area that extended 2.5 miles upriver along the Virginia shore from directly opposite Smith Point.

**Liverpool Point** is at Mile 64.4E. **Mallows Bay**, on the north side of Liverpool Point is a ship graveyard area; the western danger limit is a line from Liverpool Point to Sandy Point. A buoy marks the inner edge of the river channel off the bay. The southern part of the bay has unobstructed depths of 5 feet to the submerged wreck near the head. On the southern shore is a small bulkhead landing.

**Sandy Point**, Mile 65.5E, is marked by a light and a fog signal.

An aviation school wharf at Mile 66.2W, has depths of about 8 feet at the outer end. The short dredged channel to the wharf has a controlling depth of about 10 feet. About 0.2 mile north of the wharf, a diversion canal 10 feet deep connects **Chopawamsic Creek** with the Potomac River; three fixed bridges over the canal have a minimum width and clearance of 10 feet.

**Quantico**, Mile 67.7W, is the site of the **United States Marine Barracks**. The T-pier has depths of 25 to 30 feet at the face, and the launch harbor has depths of about 10 feet. The pier has a fog signal on the outer end.

**Quantico Creek**, Mile 68.2W, has depths of 7 feet in a narrow, crooked entrance channel, and about 2 feet for 2 miles upstream. The fixed railroad bridge over the entrance has a 29-foot span with a clearance of 8 feet. A small landing on the south side of the entrance is used by local pleasure boats.

**Possum Point** is at Mile 68.5W. A privately maintained light marks the wharf 0.2 mile northward of the point.

**Chicamuxen Creek**, Mile 69.2E, has depths of 5 feet in the entrance but shoals rapidly farther up. The creek is little used.

A danger zone of a Navy explosion test area includes part of Chicamuxen Creek and extends northeastward in Potomac River up to 0.5 mile off the Maryland shore for about 5 miles to Indian Head; see 204.41, chapter 2, for limits and regulations.

The Government wharf at the north end of **Stump Neck**, Mile 70.6E, has depths of 15 feet at the outer end and is marked by a light. Lights also mark the ends of an ice breaker on the north side. Landing is permitted only in case of emergency.

**Mattawoman Creek**, Mile 71.5E, has easily navigated depths of 7 to 5 feet for a mile to the marsh that extends southeastward from **Deep Point** to the edge of the channel. Above this marsh, the creek channel has greater depths for 3 miles but meanders back and forth between the flats and is almost impossible to follow without a guide. The mean range of tide is 1.6 feet at the entrance. Some supplies and gasoline are available at a marina at **Sweden Point**, 2 miles inside the entrance. Depths to the fuel pier are about 3 feet.

**Powells Creek**, Mile 71.1W, has depths of 4 to 5 feet in the approach and 1 to 2 feet through the railroad bridge and for a short distance upstream. The fixed railroad bridge 0.3 mile above the entrance has a width of 40 feet and a clearance of 26 feet; the old bridge 60 feet beyond has some piling removed.

**Chart 560.—Occoquan Bay**, Mile 73.8W, has general depths of 5 to 7 feet. The entrance is 2.5 miles wide between **Freestone Point** on the southwest and **High Point** on the northeast; the channel is 0.3 mile off High Point. A manmade rocky islet, 3 feet high, is near the center of the bay, a mile westward of High Point. The bay has little commerce; it and its tributaries are used as an ice harbor when the river channel is closed above.

**Neabsco Creek**, at the southwest side of Occoquan Bay north of Freestone Point, has depths of 4 to 2 feet. The fixed railroad bridge over the mouth has a 30-foot span with clearance of 33 feet. The overhead cables just west of the bridge have a clearance of 36 feet. Some supplies, gasoline, and slips are available above the bridge.

**Belmont Bay**, the northeastern arm of Occoquan Bay, has general depths of 3 to 4 feet. Belmont Bay is said to be rocky throughout; the rocks are covered at low water except during northwest winds.

**Occoquan Creek** empties into the head of Occoquan Bay along the west side of Belmont Bay. The creek has natural depths of 7 to 25 feet. The dredged channel through the bay and creek to Occoquan has a controlling depth of about 6 feet. The channel is marked through Occoquan Bay to within 0.4 mile of the first bridge over Occoquan Creek. The mean range of tide is 1.6 feet at the entrance.

Two fixed bridges over Occoquan Creek, 3.6 miles above the bay entrance, have a minimum clearance of 66 feet; the fixed bridge 0.4 mile above has a clearance of 44 feet. Piles extend into the channel on both sides of the first two bridges. A power cable over the creek, 5 miles above the bay entrance, has a clearance of 42 feet.

**Occoquan**, on the southwest side of Occoquan Creek 5 miles above the bay entrance, is the head of navigation. Channel depths off the Occoquan bulkheads are about 10 feet. Some supplies, gasoline, and slips are available

above the third bridge. Repairs can be made; lift 10 tons.

**Indian Head**, Mile 75.3S, is a high wooded bluff. The town of **Indian Head** is back of the bluff. The lower wharf has depths of 12 feet off its northern face, and the small-boat basin on the lower side has depths of 4 feet. A fog signal is on an intake house just above the wharf. The upper wharf has depths of 12 to 15 feet at the face. Landing is permitted at either wharf only in case of emergency.

**Craney Island**, Mile 77.3W, is a tiny islet marked by a clump of trees and surrounded by an extensive shoal. Between the islet and the Virginia shore is a narrow unmarked channel with depths of 7 feet.

**Pomomkey Creek**, Mile 78.0E, has depths of 7 to 3 feet in the entrance but little water inside.

**Gunston Cove**, Mile 80.0W, has depths of 3 to 5 feet in the entrance and 5 to 7 feet inside. The peninsula between Gunston Cove and Dogue Creek, 2 miles to the northeastward, is a part of the U.S. Army reservation of **Fort Belvoir**.

The small-boat basin and facilities at **Whitestone Point**, on the north side of the Gunston Cove entrance, are part of Fort Belvoir and are not for public use.

**Pohick Bay** and **Accotink Bay**, which join at the head of Gunston Cove 2 miles from the entrance, have depths of 2 to 3 feet for about 0.5 mile from the junction. Pohick Bay is foul with submerged duckblind and fish stakes. Parts of both bays are within the **danger zone** of a Fort Belvoir target range; see 204.40, chapter 2, for limits and regulations.

**Dogue Creek**, Mile 81.9W, has depths of 3 to 5 feet but is foul with grass and submerged duckblind stakes, and is little used.

**Marshall Hall**, Mile 82.3S, has an amusement park. Excursion boats operate between Marshall Hall and Washington. The excursion boat wharf has depths of about 10 feet at the face. Fuel is available at a small-boat landing south of the wharf. The fuel pier has depths of 4 feet alongside. The pipeline wharf, 200 yards southward of the excursion wharf, is in poor condition; landing is not permitted.

**Mount Vernon**, the home of **George Washington**, is at Mile 83.2N. The custom of tolling the ship's bell while passing Mount Vernon is said to have originated the night of Washington's death, December 14, 1799. The buildings are open to the public daily from 9 a.m. to 5 p.m. Excursion boats operated between Mount Vernon and the city of Washington. The buoyed dredged channel leading to the Mount Vernon wharf has a controlling depth of about 9 feet.

**Little Hunting Creek**, Mile 83.9N, has depths of about 4½ feet in a narrow channel, sometimes marked by bush stakes, for about 0.6 mile above the entrance. A stone-arch bridge over the entrance has a clearance of 22 feet for a width of 25 feet.

**Piscataway Creek**, Mile 85.4S, has depths of 2 to 7 feet. Some supplies and fuel are available at a marina

on the north side of the creek 0.5 mile inside the entrance. Repairs can be made; lift, 25 tons.

**Fort Washington**, Mile 85.8N, was built early in the 19th century for the protection of the then new nation's capital; the fort is now a unit of National Capital Parks. There is a light and fog signal on shore at the fort.

**Broad Creek**, Mile 88.0E, has depths of 2 to 4 feet. **Indian Queen Bluff** is on the north side of the entrance. The creek is little used.

**Rosier Bluff**, Mile 89.4E, is wooded and prominent. Only piles remain of the wharf just below the bluff. A light is shown from a pile in depths of 6 feet, below the bluff.

**Hunting Creek**, Mile 90.0W, has depths of 1 to 4 feet. Fixed highway bridges cross the creek 0.6 and 0.9 mile above the entrance. The lower bridge is a three-arch structure with a width of 44 feet and a clearance of 9 feet for a width of 20 feet; the upper bridge has a clearance of 3 feet. Piles marking an abandoned channel are in the north end of the bay.

On the Maryland side opposite Hunting Creek is an extensive bight dredged for sand and gravel. Depths are 8 to 20 feet in the inner part of the bight but only 1 to 5 feet along the edge of the river channel.

**Jones Point**, Mile 90.5W, is on the north side of the entrance to Hunting Creek and at the lower end of the Alexandria waterfront. **Woodrow Wilson Memorial Bridge**, Mile 90.7, which connects Jones Point with the Maryland shore, has a bascule span with a clearance of 50 feet; a fog signal is at the channel span of the bridge.

**Alexandria**, Mile 91.4W, is active in commercial traffic, including petroleum products, sand and gravel, and fertilizer materials. Foreign vessels drawing as much as 21 feet unload newsprint and some general cargo.

Pilotage to Alexandria was discussed at the beginning of the chapter. A towboat is available. Vessels subject to quarantine are required to notify the local representative of the U.S. Public Health Service. Alexandria is a customs port of entry at which marine documents are issued. See appendix for storm warning displays.

Jurisdiction of the District of Columbia harbor master extends upriver from Jones Point. Harbor regulations provide a speed limit of 10 m.p.h. when passing the wharf area of Alexandria, except in emergencies.

The Alexandria waterfront extends about 1.5 miles north of the Woodrow Wilson Memorial Bridge. Some of the wharves are owned by the Government; several of the privately owned wharves are open to the public by special arrangement. Depths of 20 to 25 feet are at the outer ends of the wharves; in places old piling is a hazard to approaching vessels. Robinson south and north terminals are 0.45 miles and 0.9 mile above the bridge, respectively; each has a 300-foot face with depths of 25 feet alongside; water is piped to the wharves.

There are small-craft facilities along the Alexandria waterfront. Supplies, fuel, and slips are available. Repairs can be made; largest marine railway, 35 feet.

**Oxon Creek**, Mile 91.6E, has bare flats in the approaches and general depths of 1 to 3 feet inside. Sand dredges have cut channels through the flats and made holes inside, but local knowledge is needed to find the deeper water. The fixed highway bridge over the creek has a clearance of 19 feet.

**Marbury Point** is at Mile 92.1E. A bush-staked channel with depths of about 7 feet leads to the point. Just northward is the Blue Plains sewage-disposal plant. The pier 0.4 miles above Marbury Point extends to deep water and is marked at its outer end by a light and fog signal. The **Bellevue pier**, 0.7 mile above Marbury Point, is marked by a light and fog signal.

**Fourmile Run**, Mile 93.0W, has depths of 10 to 20 feet in the outer basin, but there is a 3-foot spot off the south side and shoal water surrounds the other sides. Airport landing lights extend 0.5 mile into the basin from the north side. The marked entrance channel has a controlling depth of about 15 feet. The rear range is visible through a lane in the trees and bushes. The Washington Sailing Marina is in the cove on the south side of the basin just above the entrance.

**Washington National Airport** occupies the extensive fill area on **Gravelly Point** at Mile 94.1W. Many domestic and international airlines use the airport day and night.

**Giesboro Point** is at Mile 94.0E. Submerged pile remains of former wharves extend out about 150 feet from shore in the vicinity of the point.

**Washington, D.C.**, on the east side of Potomac River 96 miles above the mouth, is the **Capital of the United States**. The city, with its impressive memorials and public buildings, is one of the most beautiful in the world, and is host to a constant stream of visitors. Prominent from the river are the Capitol dome, the Washington Monument, and the Lincoln and Jefferson Memorials.

Commercial traffic in Washington Harbor consists chiefly of sand and gravel and petroleum products.

The mean range of tide is 2.9 feet; daily predictions for Washington are given in the Tide Tables. Currents are variable but the set is usually in the directions of the channels, and there is little or no flood current during freshets; information for several places in Washington Harbor is given in the Tidal Current Tables. Ice closes the river at Washington during severe winters, but power vessels keep the channels open during ordinary winters. During the highest freshet in recent years, the river rose about 11.5 feet above mean low water in Washington Channel. See appendix for Washington climatological table and storm warning displays.

Pilotage to Washington was discussed at the beginning of the chapter. Towboats are available.

**Quarantine.**—Vessels subject to quarantine are required to notify the local representative of the U.S. Public Health Service. An outpatient clinic of the Public Health Service is in Washington.

**Customs.**—Washington is a port of entry and marine documents are issued.

**Harbor regulations.**—The District of Columbia Harbor-master, who is the officer commanding the Harbor Precinct of the Metropolitan Police Department, regulates the operation, navigation, mooring, and anchoring of all vessels within the waters of the District of Columbia and enforces all laws and regulations relating thereto. The person in charge of any vessel, 26 feet or more in length, entering the harbor, shall, if he intends to remain over 24 hours, report the date and time of arrival without delay and shall also report immediately before finally departing, to the Harbormaster at the Harbor Precinct wharf, Maine Avenue and M Street, SW., or to any police officer under his command.

At Mile 94.2 is the junction of Potomac River with **Anacostia River** to the eastward, **Washington Channel** to the northward, and **Virginia Channel** of the Potomac River to the westward. The lighted junction buoy also marks the outer end of the shoal making southerly from **Hains Point**, 0.4 mile north of the junction. **Washington Harbor** comprises the navigable waters upstream from this junction.

The controlling depths in Anacostia River are about 19 feet to the foot of 15th Street SE., 2.6 miles above the mouth, thence 8 feet to the East Capitol Street Bridge, 4 miles above the mouth, and thence 3 feet to a marina 7 miles above the mouth.

**Anchorage areas**, maintained by the District of Columbia on the southeast side of Anacostia River between the third and sixth bridges, are marked by buoys. No vessel shall come to anchor in the usually travelled channel northwest of the established areas. Harbor regulations prescribe a **speed limit** of 6 m.p.h. between the entrance to Anacostia River and the Benning Road Bridge, a distance of 4.4 miles.

Anacostia River is crossed by nine bridges between the entrance and the head of navigation. The South Capitol Street Bridge, 1.4 miles above the entrance, has a swing span with a clearance of 40 feet; see 203.330, chapter 2, for drawspan regulations.

In 1966, Eleventh Street Bridge, 2.2 miles above the entrance, was being reconstructed as a fixed bridge with a clearance of 28 feet. Twelfth Street Bridge has a fixed channel span with a clearance of 28 feet. The remaining fixed bridges have a minimum width of 40 feet and clearance of 12 feet. The Pennsylvania Railroad Bridge, 3.3 miles above the mouth, has a vertical-lift span with a width of 33 feet and clearances of 5 feet down and 29 feet up; see 230.330, chapter 2, for drawspan regulations.

The waterfront of Anacostia River extends along the north side for about 3 miles above the entrance. The Washington Navy Yard Annex occupies the area just above the first bridge to the second bridge; depths at the outer piers are 19 to 23 feet. Most of the other piers and bulkhead wharves are privately owned. Oil terminals are just below the first bridge and just above the third bridge.

There are small-craft facilities on the north side of Anacostia River just above the mouth; between the third and fifth bridges; and at **Bladensburg**, 7 miles above the mouth. Supplies, gasoline, and berths are available. Repairs can be made; largest marine railway, 50 feet.

**Washington Channel** extends northward along the east side of Hains Point for 2 miles to the Fourteenth Street causeway; the controlling depth is about 19 feet. A fixed highway bridge at the upper end of the channel has a clearance of 37 feet.

**Anchorage areas**, maintained by the District of Columbia along the west side of Washington Channel, are marked by buoys. No vessel shall anchor in the channel outside these areas. Harbor regulations prescribe a **speed limit** of 6 m.p.h. upstream from Hains Point.

The waterfront facilities are on the eastern side of Washington Channel. Pier 5, a mile above Hains Point, has depths of about 23 feet at the outer end; it is the headquarters of the harbormaster and is used by his patrol boats and the Coast Guard. Pier 6, just northward, has depths of about 23 feet at the outer end; it is used by excursion boats. The municipal fish and fresh oyster wharves are just below the highway bridge, 1.5 miles above Hains Point.

Slips and minor-repair facilities for pleasure craft are at the north end of Washington Channel; largest haul-out capacities: railway, 42 feet; lift 5 tons. Fuel and other supplies are available.

**Virginia Channel** is the local name for that part of Potomac River between Hains Point and Georgetown. The controlling depth is about 15 feet to the Francis Scott Key Bridge at Georgetown, and thence 10 feet or more to Chain Bridge, the practical head of navigation.

A **measured nautical mile** on course 337° begins just above Hains Point. The front markers are yellow triangles on the **Potomac Park** seawall rail, and the rear markers are yellow diamond shapes on poles. The half-mile markers are yellow rectangles with black vertical center lines.

Virginia Channel is crossed by eight bridges between Hains Point and the head of tidewater navigation, Mile 101. All bridges have either fixed spans or drawspans fixed in the closed position; see 203.325, chapter 2. The minimum width of the bridges is 100 feet and the clearance 18 feet.

On the northeast side of Potomac River 1.6 miles above Hains Point is the entrance to the **Tidal Basin**; depths are about 6 feet in the entrance and 8 to 10 feet in the basin.

Directly across the river from the Tidal Basin is the **Pentagon Lagoon**. Depths are about 9 feet in the entrance and 7 to 10 feet in the lagoon. The fixed bridge over the entrance is a stone arch, 100 feet between piers, with a clearance of 18 feet over the middle 41 feet. On the north side of the lagoon just above the bridge is a marina with extensive berthing facilities; gasoline and

some supplies are available. There is a 2-foot shoal just south of the marina. **Boundary Channel**, which extends northward from the lagoon between **Columbia Island** and the Virginia shore, is shallow and is crossed by several fixed bridges.

**Arlington Memorial Bridge** is 2.3 miles above Hains Point and 97 miles above the mouth of Potomac River. Harbor regulations prescribe a **speed limit** of 6 m.p.h. above the bridge.

**Theodore Roosevelt Island**, Mile 97.5W, is a park area. 10 Boats should not attempt to pass between the island and the Virginia shore.

**Francis Scott Key Bridge** is at Mile 98.3W. The stone piers of the former Aqueduct Bridge, just above Key Bridge, have been removed to a depth of 10 feet except 15

for the one nearest the Virginia shore, which is 9 feet above water.

The commercial wharves are on the north side of Virginia Channel at **Georgetown** between Key Bridge and 5 **Rock Creek**, 0.6 mile downriver. The wharves, which are mostly of the bulkhead type, are privately owned. The only commercial traffic in Virginia Channel is sand and gravel by barge to a plant 0.4 mile below Key Bridge.

An **anchorage area** is maintained by the District of Columbia on the shoals between Key Bridge and the 10 **Three Sisters Islands**, which are on the Georgetown side 0.5 mile above the bridge. No vessel shall anchor between the designated area and the shores.

**Chain Bridge**, Mile 101, is the head of tidewater navigation on the Potomac River. 15

### 13. CHESAPEAKE BAY, PATUXENT AND SEVERN RIVERS

**Charts 1224 to 1226.**—From Potomac River to Patuxent River, the western shore of Chesapeake Bay is mostly low, although the 100-foot elevation does come within a mile of the water midway between the two rivers. Above Patuxent River, the ground rises and 100-foot elevations are found close back of the shore along the unbroken stretch northward to Herring Bay. Above Herring Bay, the 100-foot contour is pushed back by the tributaries. Except for the developed areas, the shore is mostly wooded.

The bay channel has depths of 42 feet or more, and is well marked by lights and buoys. The principal tributaries are Patuxent River, Herring Bay, West River, South River, Severn River, and Magothy River.

The fishtrap areas that extend along this entire section of the western shore are marked at their outer limits and are shown on the charts.

Ice is encountered in the tributaries, particularly during severe winters. When threatened by icing conditions, certain lighted buoys may be replaced by lighted ice buoys having reduced candlepower or by unlighted buoys, and certain unlighted buoys may be discontinued; see Light List.

**Chart 1224.**—The danger zone of an aerial gunnery range and target area begins off Point Lookout and extends northward to Cedar Point; see 204.42, chapter 2, for limits and regulations.

A middle ground with depths of 10 to 18 feet is about 8 miles eastward of Point Lookout; the area is about 7 miles long in a north-south direction and 2 miles wide. The stranded wreck near the middle of the shoal is marked by lighted buoys.

**Chart 557.**—St. Jerome Creek, 5 miles north of Point Lookout, has general depths of 8 to 4 feet above the marked 5-foot entrance channel. The creek is used principally as an anchorage for oystering and fishing boats.

There are several small wharves along St. Jerome Creek. The landing at Airedale, on the south side just above the entrance, has depths of about 5 feet at the channel face; gasoline is available.

**Point No Point**, on the west side of Chesapeake Bay 6 miles north of Point Lookout, has no prominent natural marks. **Point No Point Light** ( $38^{\circ}07.7' \text{ N.}$ ,  $76^{\circ}17.4' \text{ W.}$ ), 52 feet above the water, is shown from a white octagonal brick dwelling on a brown cylinder, in depths of 22 feet, 1.6 miles southeastward of the point; a fog signal is sounded at the light. The light is 1.7 miles due west

of a point on the bay ship channel 76.4 miles above the Capes.

An aerial target is 5.5 miles north-by-west of Point No Point Light; see 204.42, chapter 2, for limits and regulations of the prohibited area. The 200-yard-square target area has rock and concrete piers at the corners and in the center, all in depths of 37 feet. Each pier is 50 feet in diameter and 12 feet high; lighted buoys are moored east and west of the target.

**Hooper Island Light** ( $38^{\circ}15.4' \text{ N.}$ ,  $76^{\circ}15.0' \text{ W.}$ ), 63 feet above the water, is shown from a white conical tower on a brown cylindrical base, in depths of 18 feet near the outer edge of the shoals, 3 miles westward from Hooper Islands; a fog signal is sounded at the light. The light is 2.8 miles due east of a point on the bay ship channel 84.4 miles above the Capes.

**Chart 553.**—The inclosed Navy seaplane basin 8.5 miles north-northwestward of Point No Point and 2 miles southwestward of Cedar Point has depths of about 10 feet; a light marks the outer end of the north breakwater.

**Cedar Point** is 10 miles north-by-west of Point No Point. The ruins of an abandoned lighthouse are on the tiny islet 0.3 mile off the point. The shoal extending 0.5 mile eastward from the islet is marked at its outer end by a lighted buoy.

**Charts 553, 561.**—Patuxent River empties into the west side of Chesapeake Bay 89.3 miles above the Virginia Capes. Commercial traffic consists chiefly of shellfish and shells, and petroleum products. Drafts of vessels using the river are mostly 7 feet or less and seldom exceed 12 feet.

The river has natural depths of 25 to 30 feet in the approach, 30 to over 100 feet for 16 miles upstream, thence 23 feet to the Benedict highway bridge 19 miles above the mouth, thence 10 feet for 12 miles to within 2 miles of Nottingham, thence 6 feet for 5 miles, and thence 3 feet to Hills Bridge, 40 miles above the mouth. The channel is not difficult to follow as far as the Benedict bridge, and the principal shoals are marked by lights and buoys; the channel above the bridge is narrow in places and is marked only by an occasional buoy.

Anchorage can be had off the mouth of Patuxent River; shelter from westerly winds is found in depths of 20 to 30 feet close to shore on the north side of the approach. Shelter from easterly winds is found in depths of 30 to 50 feet in the channel about 1.5 miles above the entrance.

Bottom in Patuxent River channel is mostly soft as far as the Benedict highway bridge, and vessels can

anchor where convenient. Small vessels anchor in the creeks back of Solomons Island, but there is little swinging room. St. Leonard Creek is a good small-vessel anchorage in any weather.

The mean range of tide is 1.2 feet at the entrance to Patuxent River, 1.6 miles at Benedict, and 2.5 feet at Nottingham. The current velocity is 0.4 knot in the entrance to Patuxent River off Drum Point. Ice closes the river to near the mouth in severe winters.

The principal places along Patuxent River for supplies and small-vessel repairs are in the creeks back of Solomons Island. Supply and repair facilities are also available in Cuckold Creek.

Patuxent River empties into the head of the bight between Cedar Point and Cove Point, 5 miles to the northward. Cove Point Light ( $38^{\circ}23.2' N.$ ,  $76^{\circ}22.9' W.$ ), 45 feet above the water, is shown from a white tower on the point; a radiobeacon and fog signal are at the light. The light is 1 mile due west of a point on the bay ship channel 92.6 miles above the Capes. The daytime vessel-reporting station at the light communicates with Baltimore by telephone. The high bluffs on Little Cove Point, 1.5 miles to the southward, are prominent.

The entrance to Patuxent River is between Drum Point and Fishing Point, 0.9 mile to the southward. The shoals that extend off Fishing Point and Hog Point, a mile to the east-northeastward, are marked at their outer ends by lighted buoys.

A light and fog signal are 50 yards south of the abandoned lighthouse on Drum Point.

Mileages on Patuxent River, shown as Mile 8W, 11E, etc., are the nautical miles above the midchannel point on a line drawn between Drum and Fishing Points. The letters N, S, E, and W following the numerals denote by compass points the side of the river where each feature is located.

The Patuxent River Naval Air Station is along the south side of the entrance. The inclosed seaplane basins, Mile 0.8S and 1.3S, have general depths of 11 to 15 feet. A restricted area off the air station begins at the mouth of the river and extends upstream about 2.5 miles; see 207.125, chapter 2, for limits and regulations.

Solomons Island, Mile 1.8N, is joined to the mainland on the northwest by a causeway. The shoal that extends 500 yards southward from Sandy Point, at the south end of the island, is marked at its outer end by a lighted buoy. Solomons, the village on the island, is populated mostly by oystermen and fishermen. The wharf of the Chesapeake Biological Laboratory on the east side of the island has depths of 8 feet at the outer end and is marked by a light.

Back Creek and Mill Creek have a common entrance between Solomons Island and the mainland 200 yards to the north-northeastward. The main approach, between the island and the shallow middle ground to the eastward, has depths of 20 to 25 feet and is marked by lights and

a lighted buoy. The second approach, between the middle ground and the mainland to the northward, has depths of 12 feet and is marked by buoys.

The two creeks separate just above the entrance. Mill Creek goes eastward of a shallow spit with a small islet at the southern end, and Back Creek goes westward; the spit and the islet are marked by lights.

See appendix for storm warning display.

The Back Creek cove between the islet and the inner side of Solomons has general depths of 15 feet and is used as an anchorage by many yachts and fishing boats. The largest marine service pier has depths of 10 feet at the outer end. Supplies, fuel, and slips are available at Solomons. Repairs can be made; largest lift, 12 tons.

Back Creek has depths of 12 feet for 0.7 mile above the cove, thence 10 to 6 feet for another 0.5 mile. Some supplies, fuel, and slips are available at marinas on both sides of the river, 0.6 mile above the entrance. Repairs can be made; largest haul-out facilities: railway, 40 feet; lift, 25 tons.

Mill Creek has depths of 16 to 12 feet for 1.2 miles, thence 10 to 4 feet for another mile. Two submerged wrecks lie in 8 feet of water along the east side of the channel 0.6 mile above the mouth. Midchannel courses will safely pass the wrecks. Repairs can be made at a boatyard on the east side of the creek 0.3 mile above the entrance; largest lift, 20 tons. Fuel is available.

Town Point is at Mile 2.9S. Gasoline is available at one of the piers on the north side of the low point, and also in the cove inside the point.

Point Patience is at Mile 3.9N; a light is near the tip of the point, and a buoy marks the shoal just outside the light. The long government piers on the east and west sides of the point have depths of 20 feet or more at their outer ends; see 207.125, chapter 2, for limits and regulations of the restricted area in the vicinity of these piers.

Cuckold Creek and Mill Creek (not to be confused with the Mill Creek near Solomons Island) have a common entrance at Mile 4.7W. A buoy marks the outer end of the shoal that extends 0.4 miles southeastward from the point on the north side of the entrance, and daybeacons mark the entrance channel. Gasoline and some supplies are available at Clarks Wharf, on the peninsula between the two creeks. Depths at the fuel pier are about 6 feet.

Cuckold Creek, which extends northwestward from the entrance, has depths of 15 to 11 feet for a mile, thence 10 to 4 feet into the several arms. A marina and marine service dock are on the south side of the creek 0.6 mile and 0.9 mile above the entrance, respectively. Gasoline and some supplies are available. Repairs can be made; largest marine railway, 60 feet.

Hellen Creek, Mile 5.3E, has depths of 3 feet over the bar at the entrance, which is marked by bush stakes, thence 11 to 5 feet for a mile; the deeper water favors the east side of the entrance. The creek is used principally as a small-boat harbor.

**St. Leonard Creek**, Mile 7E, has depths of 15 to 10 feet for 2 miles, then shoals gradually to 1 foot at the head, 3.5 miles above the entrance. Safe anchorage in any weather is available in depths of 15 to 21 feet, 0.5 mile above the entrance. Fuel is available at a yacht club on the east side, 2 miles above the mouth; minor repairs can be made. Gasoline is also available at a pier on the west side about a mile above the mouth. The shoal that extends 0.4 mile southward from **Petersons Point**, on the northwest side of the entrance, is marked at its outer end.

**Broomes Island**, which is not an island but a mainland peninsula, is at Mile 9.5N. A light marks the limit of the shoal area extending 0.2 mile southward of the peninsula.

**Island Creek**, which empties into Patuxent River along the east side of Broomes Island, has depths of 8 to 10 feet for a mile, but there are unmarked shoals, particularly along the west side of the entrance; a light marks the east side of the entrance.

The village of **Broomes Island** is on the west side of Island Creek about a mile from the outer end of the peninsula. A marine railway can haul out boats up to 40 feet in length. Gasoline and some supplies are available.

**Nan Cove**, on the west side of Broomes Island, has a 6-foot marked channel leading to a turning basin in the upper end of the east arm.

A 5½-foot channel leads to a marina at the entrance to **Cat Creek** at Mile 12.6W. Some supplies, fuel, slips, and a 10-ton lift are available.

**Battle Creek**, Mile 13.2E, has depths of 10 to 7 feet for 1.5 miles, but local knowledge is needed to navigate between the 2-foot shoals on either side of the channel just above the entrance. The shoal that extends 0.3 mile southwestward from the point on the east side of the entrance is marked at its outer end by a light.

The highway bridge over Patuxent River at Mile 18.8, from **Town Point** on the west side to **Hallowing Point** on the east side, has a swing span with a clearance of 16 feet; see 203.245, chapter 2, for drawspan regulations.

**Benedict**, a village just below the west end of the highway bridge, is the head of commercial navigation on Patuxent River. The marine service dock at Benedict has depths of 5 feet at the outer end; gasoline and some supplies are available. Other docks along the waterfront have depths of 4 to 9 feet at their outer ends. Marine railways can haul out boats up to 40 feet in length for repairs.

Depths of 4 feet can be carried to a small-boat basin just below Hallowing Point. Gasoline and water are available.

Navigation on Patuxent River above Benedict is difficult because of the numerous fishtraps and stakes.

Overhead power cables with a clearance of 60 feet cross Patuxent River at Mile 20.9. The supporting towers are marked by lights.

An overhead power cable across Patuxent River at Mile 25.5, a mile above **Holland Cliff**, has a clearance of

46 feet.

**Lower Marlboro** is a village at Mile 28.3E. The State landing has depths of 12 feet at the face.

**Nottingham**, a village at Mile 32.8W, has a landing with depths of 13 feet at the face.

**Flag Harbor**, on the west side of Chesapeake Bay 6.3 miles northwest of Cove Point, has depths of about 3½ feet in the entrance channel leading to a small-boat basin. The 600-foot stone jetties on either side of the entrance are almost covered at high water. Gasoline is available.

**Chart 551.**—The danger zone of the Naval Research Laboratory firing range fans out from a point near **Randle Cliff Beach**, 18 miles northward of Cove Point; see 204.32, chapter 2, for limits and regulations. The laboratory towers are prominent.

**Chesapeake Beach**, a resort and fishing center, is on the western shore 19.6 miles above Cove Point. A marked channel with a controlling depth of about 6 feet leads into an anchorage basin on the north side of the resort which is the outlet for **Fishing Creek**. A fixed highway bridge 0.3 mile above the entrance jetties has a width of 36 feet and a clearance of 10 feet.

Supplies, fuel, and berths are available at Chesapeake Beach. Repairs can be made; largest haul-out capacities: railway, 55 feet; lift, 25 tons.

**Chart 550.**—**Holland Point**, on the western shore 21.6 miles above Cove Point, has shoal areas extending in all directions; depths of 11 feet are 1.3 miles to the eastward and northeastward. Buoys mark the outer edges of the shoals.

**Herring Bay**, between Holland Point and the marsh 3 miles to the northward, has general depths of 14 to 7 feet. **Long Bar**, with depths of 2 to 5 feet, extends from the north side of the bay to within a mile of Holland Point, and is marked at its south end by a light.

**Rose Haven Harbor**, on the south side of Herring Bay 0.6 mile west of Holland Point, has a marked entrance channel with a controlling depth of about 5 feet. Some supplies, fuel, and berths are available. Repairs can be made; lift, 40 tons.

**Rockhold Creek**, at the northwest corner of Herring Bay, has good shelter for small boats. A marked channel with a controlling depth of about 5 feet extends from the entrance of the creek to near the county wharf just below the fixed highway bridge at **Deale**. Depths are 3 to 5 feet for about 0.4 mile above the bridge. A light marks the outer end of the breakwater on the north side of the entrance. The mean range of tide is 0.9 foot. The fixed highway bridge a mile above the entrance has a width of 19 feet and a clearance of 10 feet. The fixed highway bridge 1.8 miles above the entrance has an opening 41 feet wide with a clearance of 10 feet.

Extensive marine facilities are on both sides of Rockhold Creek. Supplies, fuel, and berths are available.

Repairs can be made; largest haul-out capacities: railway, 54 feet; lift, 12 tons.

**West River**, on the west side 29 miles above Cove Point, has depths of 14 to 7 feet for 4 miles to **Galesville**, then shoals gradually to less than 3 feet in the tributaries. Shoals extend nearly to midriver off some of the points, but the critical places are marked. The mean range of tide is 0.9 feet. See appendix for **storm warning display**.

**Parish Creek**, on the south side of West River 0.5 mile above the mouth, has a controlling depth of about 7 feet in a marked channel to **Shady Side**, at the head of the south fork.

**Rhode River**, on the north side of West River a mile above the mouth, has depths of 11 to 9 feet for 2 miles. The critical shoals extending off the points are marked.

**Cadle Creek**, on the east side a mile above the mouth, has depths of 4 to 7 feet. **Mayo** is on the east side 0.3 mile above the entrance. **Bear Creek**, on the north side 1.5 miles above the mouth, has depths of 9 to 5 feet for a mile.

There are small-craft facilities at **Shady Side**, **Galesville**, **Mayo**, and other places along the tributaries of West River. Supplies, fuel, and berths are available, and repairs can be made. The largest boatyards are at or near **Galesville** where craft up to 110 feet in length can be hauled out.

**South River**, just north of West River, has channel depths of 14 feet or more to the second bridge, 6 miles above the mouth, then shoals gradually to 2 feet at the bridge near the head, 8.5 miles above the mouth. The principal shoals in the lower half of the river are marked. Several of the creeks that flow into the river have good depths and are used extensively by local yachts and motorboats. Although there are no commercial facilities in the creeks on the north side below the first bridge, most of these tributaries are reported to provide good anchorage.

The entrance to South River is between **Saunders Point** and **Thomas Point**, 1.8 miles to the northeastward. **Thomas Point Shoal Light** ( $38^{\circ}53.9' N.$ ,  $76^{\circ}26.2' W.$ ), 43 feet above the water, is shown from a white hexagonal tower on brown piles, in depths of 7 feet near the outer end of the shoal 1.2 miles east-southeastward of the point; a fog signal is at the light; special radio direction-finder calibration service is provided; see Light List. The light is 1.5 miles due west of a point on the bay ship channel 124.2 miles above the Capes.

**Selby Bay**, on the southwest side of South River 1.7 miles above the mouth, has general depths of 8 to 11 feet. The south end of the bay is shallow and heavily covered with grass. The channel to **Selby Beach**, on the northwest side of the bay, is marked by lights and a daybeacon. **Ramsay Lake** has a narrow entrance from the south end of Selby Bay; depths are about 2 feet in the entrance and 7 to 8 feet in the lake. The fixed highway bridge over

the Selby Bay entrance to the lake has a width of 20 feet and a clearance of 10 feet.

**Brewer Creek**, on the southwest side of South River 3 miles above the mouth, has depths of 12 feet in the entrance but only 4 feet through the narrows 0.2 mile above the entrance.

**Glebe Creek**, on the southwest side of South River 3.5 miles above the mouth, has depths of 15 to 11 feet for a mile. Care should be taken to avoid the 2-foot shoal in the center of the creek 0.3 mile above the entrance.

The highway bridge at **Edgewater**, 5 miles above the mouth of South River, has a swing span with a clearance of 13 feet; see 203.245, chapter 2, for drawspan regulations.

**Gingerville Creek**, on the north side of South River, just above Edgewater bridge, has depths of 6 feet for 0.7 mile, nearly to the head.

The speed limit is 8 m.p.h. in South River and tributaries above the Edgewater bridge between May 1 and September 15; see 207.120, chapter 2.

**Beards Creek**, on the south side of South River 5.7 miles above the mouth, has depths of 15 to 8 feet for a mile; a shallow spit extends halfway across the entrance from the point on the northwest side. The highway bridge at **Riva**, 6 miles above the mouth of South River, has a fixed span with a clearance of 25 feet.

There are numerous small-craft facilities on the south side of South River to the second bridge and on the north side of the river at the first bridge. Supplies and gasoline can be obtained at most places and repairs can be made. Diesel fuel is available in Selby Bay, and at Edgewater and Riva. Marine railways can handle boats up to 55 feet in length; the largest lift is 12 tons.

**Chart 566.—Severn River**, the approach to Annapolis, empties into Chesapeake Bay 127 miles above the Virginia Capes. Commercial traffic consists chiefly of petroleum products, and some fish and shellfish. Naval craft and many pleasure craft use the river.

The river has main channel depths of 17 feet or more from the entrance to Annapolis, thence 15 feet or more for 8 miles, thence 11 to 7 feet for 2 miles to within a mile of the head. The channel is well marked as far as Annapolis, above which it is marked at the critical points and is easy to follow.

The mean range of tide is 0.9 foot, and is greatly influenced by winds. The current velocity seldom exceeds 0.5 knot. Ice rarely interferes with navigation except in severe winters, and then only for a short time.

**Chart 385.—The entrance to Severn River** is between **Tolly Point** and **Greenbury Point**, 2 miles to the northward. **Tolly Point Shoal**, with depths of 4 to 5 feet, extends a mile east-southeastward from the point; it is marked at its outer end by a lighted buoy.

The entrance to **Lake Ogleton** is on the southwest side of Severn River 0.8 mile above Tolly Point. The lake has depths of 5 to 9 feet, but the narrow entrance, marked

by daybeacons, has only about 3 feet. The small private wharves along the shore of the lake are used mostly for mooring pleasure craft.

**Greenbury Point** is on the north side of the entrance to Severn River. The tall towers of the naval radio station on the point are prominent from up and down the bay; each tower has a flashing red light on top and fixed red lights on the sides. A light and fog signal mark the shoal extending 0.4 mile south of the point. A 3-foot depth at the outer tip of the shoal is 250 yards westward of the light and only 100 yards northeastward of the buoyed entrance channel.

A naval deep-draft **anchorage area** is southeast of Greenbury Point, and several smaller naval anchorages and prohibited anchorage areas are west and northwest of the point; see 202.159, chapter 2, for limits and regulations.

Seaplane **restricted areas** extend eastward from Greenbury Point and southward from Tolly Point; see 207.115, chapter 2, for limits and regulations.

The entrance to **Carr Creek** is northwest of Greenbury Point. The creek has depths of 9 feet over the unmarked entrance bar and deeper water through a narrow channel inside. A naval rifle range is on the west side of the entrance to the creek. Mariners are warned to keep out of the creek when the red flag is flying from **Carr Point** or the next point southward.

**Back Creek**, on the southwest side of Severn River 0.7 mile above the mouth, has depths of 7 to 9 feet for most of its 1-mile length. A light marks the outer end of the breakwater on the south side of the entrance, and a light and a daybeacon mark the south side of the narrow entrance channel. The creek is used by fishing boats and pleasure craft. A Coast Guard station is on the north side of the entrance. Most of the berthing and repair facilities are at **Eastport** along the north side of the creek; largest haul-out capacities: railway, 50 feet; lift, 25 tons. Supplies and fuel are available.

**Spa Creek**, on the southwest side of Severn River 1.4 miles above the mouth, has depths of 13 feet in the entrance channel, thence 10 feet to the highway bridge, and thence 10 to 6 feet for 0.7 mile to near the head. Drafts of vessels using the creek are mostly 10 feet or less. The highway bridge from Eastport to Annapolis, 0.4 mile above the entrance, has a 40-foot bascule span with a clearance of 15 feet.

**Annapolis**, the capital of Maryland, is on the north side of Spa Creek. The U.S. Naval Academy occupies the entire northeastern part of the city between Spa Creek and Dorseys Creek, 0.7 mile to the northwest. Annapolis is a **customs** port of entry at which marine documents are issued. See appendix for **storm warning displays**.

The Naval Academy basin, on the Severn River side of Annapolis, has depths of 13 feet, and the Spa River waterfront almost to Market Slip, has depths of 4 to 10 feet alongside the bulkhead and wharves.

**Market Slip**, 250 yards below the north end of the Spa River highway bridge, is 250 yards long and 40 yards wide, with depths of 10 to 8 feet; the slip is open to the public and is used extensively by small craft.

Extensive marine facilities are on both sides of Spa Creek below the bridge. Supplies, fuel, and berths are available. Most of the boatyards are on the south, or Eastport, side of Spa Creek; largest haul-out capacities: railway, 130 feet; lift, 75 tons.

The U.S. Navy **Marine Engineering Laboratory** is part of the Government reservation extending from Carr Creek along the eastern shore of Severn River for about a mile to **Ferry Point**. The small-boat basin, 0.4 mile westward of Carr Creek, can be entered only in an emergency. See 207.116, chapter 2, for limits and regulations of the **restricted area** extending off the piers north of the basin.

**Dorseys Creek**, on the southwest side of Severn River 2.1 miles above the mouth, has depths of 11 to 8 feet for most of its 1-mile length; the best water in the entrance is along the south side. A fixed footbridge, three drawbridges, and two fixed bridges cross the creek from Annapolis on the southeast bank to **West Annapolis** on the northwest bank. The drawspans are secured in a fixed position; see 203.245, chapter 2. The bridges have a minimum width of 40 feet and a clearance of 5 feet.

The highway bridge 2.4 miles above the mouth of Severn River has a bascule span with a clearance of 16 feet; see 203.310, chapter 2, for drawspan regulations. The railroad bridge 3 miles above the mouth has a swing span with a clearance of 6 feet.

**Chart 566.—Weems Creek**, on the southwest side of Severn River 3.2 miles above the mouth, has depths of 13 feet for 0.8 mile, thence 11 to 7 feet for 0.3 mile to near the head. A shoal extends 300 yards eastward from the point on the north side of the entrance, and is marked by a buoy. The highway bridge 0.5 mile above the entrance has a swing span with a width of 28 feet and a clearance of 5 feet; see 203.245, chapter 2, for **drawspan regulations**. The fixed highway bridge about 500 feet above the drawbridge has a clearance of 28 feet.

The fixed highway bridge over Severn River, 3.5 miles above the mouth, has a clearance of 80 feet.

**Round Bay**, an expansion of Severn River beginning 6 miles above the mouth and continuing for 2 miles, has depths of 17 to 23 feet, and is traveled extensively by motorboats. **Little Round Bay**, west of Round Bay, has depths of 17 to 19 feet, and is marked by daybeacons. Depths of 4 feet can be carried to a boatyard in **Browns Cove**, behind **St. Helena Island**. Gasoline and some supplies can be obtained. Repairs are made; travelift, 12 tons.

**Forked Creek**, on the north side of Severn River 9 miles above the mouth, has depths of 16 to 10 feet for most of its 0.4-mile length. The marine service pier in the creek has depths of 8 feet at the outer end; gasoline and some supplies are available. A yacht yard has berths

and does repair work on small craft; marine railway. 50 feet.

There is a small-boat basin on the east side of Severn River, 11 miles above the mouth, where gasoline and some supplies are available. The controlling depth to the basin is about 3 feet.

**Charts 385, 566.—Whitehall Bay**, on the west side of Chesapeake Bay, is between Greenbury Point and Hackett Point, 1.5 miles to the northeastward. The bay has general depths of 13 to 6 feet. The entrance channel is about 300 yards wide between Whitehall Flats on the west and North Shoal on the east, both with depths of 3 to 4 feet; a light marks the outer end of North Shoal.

**Mill Creek**, which empties into the northwest corner of Whitehall Bay, has depths of 2 feet over the bar across the entrance, thence 7 to 14 feet for 1.5 miles to near the head. With local knowledge, 6 feet can be carried in the narrow, crooked entrance channel. Gasoline is available at a pier 0.7 mile above the entrance. A marine railway, 1.3 miles above the entrance, can haul out boats up to 50 feet in length. Gasoline and water are available just west of the railway.

**Whitehall Creek**, which empties into the northeast corner of Whitehall Bay, has depths of 9 to 13 feet for 1.5 miles, then shoals gradually to 1 foot at the head 0.5 mile farther up. The narrow, crooked entrance channel is marked by buoys and daybeacons. Gasoline is available at the entrance to a cove on the west side, 0.9 mile above the mouth; a marine railway can haul out boats up to 40 feet in length for repairs. The marine service pier on the northeast side of Whitehall Creek, 1.4 miles above the entrance, has depths of 10 feet at the outer end; gasoline and some supplies are available. The marine railway at the pier can handle boats up to 50 feet in length for repairs.

**Meredith Creek**, in the northeast corner of Whitehall Bay just eastward of Whitehall Creek, has depths of about 2 feet in a very narrow entrance, thence 10 to 7 feet for 0.7 mile, then shoals gradually to 1 foot at the head, 0.6 mile farther up. Local knowledge is necessary to carry more than 2 feet through the entrance.

**Chart 566.—Chesapeake Bay Bridge** (see also charts 550 and 1225), 180 miles above the Virginia Capes, is 3.7 miles long from shore to shore; the western end is 0.5 mile southwestward of Sandy Point, and the eastern, or Kent Island, end is 4 miles south-southwestward of Love Point.

The suspension span over the main channel 1.4 miles from the western end of the bridge has a width of 1,533 feet and a clearance of 187 feet. Flashing red aero lights are mounted on top of the two suspension towers. Three fixed white lights are mounted vertically at the center of the main channel span over fixed green range lights. Fog signals are mounted on the south and north sides of the bridge at the center of the main channel span.

The fixed span over the secondary channel 1.2 miles from the eastern end of the bridge has a width of 708 feet and a clearance of 58 feet. The center of the span is marked by a range of two green lights. A fog signal is at the span center.

Red lights mark the ends of the bridge piers, except those adjacent to the main channel, between points 0.3 mile from the western end and 1 mile from the eastern end. Lighted buoys mark the main channel on either side of the bridge. The abandoned Sandy Point-Matapeake Ferry Terminal is just south of the west end of the bridge. Mariners are permitted to tie up at the old slips in case of emergency. The north half of the terminal is State owned; the south half is privately owned. Depths of about 10 feet can be carried into the slips.

**Sandy Point Light** (39°01.0' N., 76°23.1' W.), 51 feet above the water, is shown from a red brick house with white roof, on a brown cylinder pier in depths of 13 feet 0.4 mile northeastward of Sandy Point. A fog signal is sounded at the light. The light is 0.5 mile due west of a point on the bay ship channel 131.5 miles above the Capes.

**Baltimore Light** (39°03.5' N., 76°24.0' W.), 52 feet above the water, is shown from a white, octagonal, brick house on a brown cylinder pier, in depths of 22 feet, 2.5 miles north of Sandy Point.

**Magothy River**, on the west side of Chesapeake Bay 1.7 miles westward of Baltimore Light, has depths of 10 feet or more for 6 miles, thence 4 feet for 0.5 mile to within 0.2 mile of a fixed highway bridge. There are many excellent anchorages in the numerous tributaries, and the area is a favorite cruising ground for pleasure craft. The critical points along the lower half of the channel in Magothy River are marked.

The entrance to Magothy River is between Persimmon Point and Mountain Point, 0.4 mile to the north-northeastward. Mountain Point, the southernmost extremity of Gibson Island, is a sandy spit making out from a high wooded bluff. The current velocity is 0.6 knot on the flood and 0.3 knot on the ebb in the entrance to Magothy River.

**Deep Creek**, on the south side of Magothy River 0.5 mile above the mouth, has depths of 7 to 5 feet for 0.6 mile to near the head. Gasoline is available at a marina on the south side of the entrance to the creek.

**Sillery Bay**, on the north side of Magothy River along the west side of Gibson Island, has general depths of 8 to 13 feet. The bay is the approach to Magothy Narrows and the harbor on the north side of Gibson Island; the eastern shore of the island is connected with the mainland on the north by a causeway.

The marked channel through Magothy Narrows has depths of about 10 feet, and there are depths of 9 to 10 feet in Inner Harbor. A speed limit of 8 m.p.h. is prescribed for waters between Magothy Narrows and Inner Harbor; see 207.110, chapter 2. The Gibson Island Yacht Club has facilities in Inner Harbor; see appendix for storm warning display.

A marine service pier on the east side of the entrance to **Redhouse Cove**, at the west end of Inner Harbor, has depths of 9 feet at the outer end; gasoline and some supplies are available. The boatyard can haul out craft up to 50 feet in length for repairs.

**Cornfield Creek**, which flows into the eastern end of Magothy Narrows, has depths of 7 feet nearly to its head. Fuel is available at a pier just above the mouth.

**Grays Creek**, in the northwest side of Sillery Bay, has depths of about 3 feet over the entrance bar through a narrow marked channel with deeper water inside. A boatyard just inside the north prong has a marine railway that can haul out boats up to 45 feet in length for repairs. Gasoline and some supplies are available.

**Broad Creek**, on the north side of Magothy River 2.5 miles above the mouth, has depths of 9 feet or more to a marina in the upper end where gasoline and some supplies are available. Hull repairs can be made; lift, 10 tons.

**Blackhole Creek**, on the north side of Magothy River 3.5 miles above the mouth, has depths of 7 feet in a narrow marked entrance channel, and 5 or more feet almost

to the head. A special small-vessel **anchorage area** is in the cove on the west side of Blackhole Creek 0.2 mile above the entrance; see **202.1** and **202.72**, chapter 2, for limits and regulations.

5 **Mill Creek and Dividing Creek** have a common entrance on the south side of Magothy River, 3.8 miles above the mouth. Depths of 8 to 12 feet can be carried in both creeks for about 0.3 mile. A marina just inside Mill Creek has gasoline and some supplies. Repairs can be made; marine railway, 40 feet.

10 **Cypress Creek** is on the southwest side of Magothy River 4 miles above the mouth. The entrance channel marked by daybeacons has a controlling depth of 7 feet with depths of 9 feet inside gradually shoaling to the flats at the head. Fuel and supplies are available at a marine service pier on the south side of the northwest arm. Repairs can be made at a boatyard on the east side of Cypress Creek just inside the entrance.

15 Gasoline is available at a pier on the southwest side of Magothy River, 5 miles above the mouth; minor repairs can be made.

## 14. CHESAPEAKE BAY, EASTERN SHORE

**Charts 1222 to 1226.**—The Eastern Shore of Chesapeake Bay, from Cape Charles to Chester River, is mostly low and has few prominent natural features. The mainland and the islands are subject to erosion, and many of the islands and points have completely washed away. **Fishtrap** limits are shown on the charts and usually are marked by black and white horizontal-banded buoys. In the tributaries of Pocomoke Sound, ice sufficient to interfere with the navigation of small vessels may be encountered at any time from January through March. The ice from Pocomoke Sound does not interfere with the larger vessels in the bay, but the smaller oyster and fishing boats frequently are held up and sometimes require assistance, especially in Kedges and Hooper Straits.

**Chart 563.**—Wise Point, the mainland tip of Cape Charles, is included in chapter 9, which also describes Fisherman Island, Cape Charles Light on Smith Island, and the Atlantic entrance to Chesapeake Bay.

**Kiptopeke Beach**, 3.2 miles northward of Cape Charles, is the site of a former ferry terminal. The offshore breakwaters are obsolete ships filled with sand and sunk end-to-end. Just northward of the abandoned terminal is **Butlers Bluff**, which has steep bare faces conspicuous from the bay.

**Old Plantation Creek**, 7 miles northward of Cape Charles, has depths of about a foot. Many of the bars and middle grounds are marked by discolored water and the channel usually is marked by bush stakes, but it is narrow and difficult to navigate without local knowledge. The opening in the thick woods at the mouth is visible from outside. No supplies are available along the creek.

**Old Plantation Flats Light** ( $37^{\circ}13.7' N.$ ,  $76^{\circ}02.8' W.$ ), 35 feet above the water, is shown from a square white structure on piles in 10 feet on the north end of the flats, 1.5 miles from shore; a fog signal is at the light. The current velocity is about 1.3 knots 0.5 mile west of the light.

**Cape Charles Harbor**, 9 miles northward of Cape Charles, is a dredged basin on the south side of the town of Cape Charles. A well-marked channel just north of Old Plantation Flats Light leads to the harbor between a sand mole on the south and a stone jetty on the north; the controlling depth is about 15 feet. The turning basin at the east end of the harbor has a controlling depth of about 9 feet.

The mean range of tide is 2.4 feet at Cape Charles. The tidal currents set across the entrance to the dredged channel, but farther north they follow the general direction of the axis. The channel is exposed to westerly

winds but is partially protected by the flats to the westward, and seldom is too rough for motorboats. Navigation is not hindered by ice. Because of the limited space in the channel and harbor, the larger vessels and tows occasionally are somewhat of a hazard to small boats.

Cape Charles is a customs port of entry where marine documents are issued. The town is a terminus of the Pennsylvania Railroad, which operates car floats to Little Creek.

Cape Charles Harbor is owned by the Pennsylvania Railroad but is open to the public. Small craft seeking shelter in the harbor should moor so as not to interfere with the railroad vessels. The larger vessels load and discharge at the wharf on the north side of the harbor, and fishing craft and other small boats make fast to the bulkhead on the south side and at the eastern end. Depths alongside the wharf are about 15 feet. The municipal bulkhead on the south side of the inner basin has depths of 9 to 13 feet alongside; fuel is available in this basin. Some supplies can be obtained in town.

**Cherrystone Channel** is a passage inside Old Plantation Flats that leads from deep water 2 miles south-southeastward of Old Plantation Flats Light northward to Kings Creek and Cherrystone Inlet. The route follows part of the channel to Cape Charles Harbor for about a mile. Depths of 10 feet or more are available in the marked channel to the vicinity of **Cherrystone Island**, a mile north of Cape Charles Harbor. The channel is narrow in places and local knowledge is required to carry the best water.

**Kings Creek**, eastward of Cherrystone Island, has depths of  $3\frac{1}{2}$  feet for a mile upstream. The shoal that extends out from the north side of the entrance bares at low water and is marked by daybeacons. The creek is used extensively by fishermen and pleasure craft. Fuel, slips, and some supplies are available at marinas just inside the entrance; a marine railway can haul out boats up to 60 feet in length for minor repairs.

**Cherrystone Inlet**, which extends northeastward from Cherrystone Island, has depths of 5 feet for 2 miles, thence 4 to 2 feet to the upper end. The channel in the inlet sometimes is marked by bush stakes, but it is narrow and difficult to navigate without local knowledge.

Boats bound for Kings Creek or Cherrystone Inlet can leave the Cape Charles Harbor channel west of the jetty on the north side of the harbor entrance and proceed northward in Cherrystone Channel. Depths of 2 to 4 feet over the flats that extend southward 2 miles along the west side of Cherrystone Channel from Cherrystone Island limit the draft that can be carried over that area

from westward and northwestward. The area between Cherrystone Island and Westcott Point bares at low water.

**Chart 564.**—Hungar Creek and Mattawoman Creek have a common outlet to the bay 8 miles northward of Cape Charles Harbor. Both creeks are marked by bush stakes, but are difficult to follow without local knowledge.

Hungar Creek extends about 4 miles in a northeasterly direction to Bridgetown. Depths of 3 feet are available in the narrow entrance channel marked by lights, thence decreasing to 1 foot to Bridgetown where supplies can be obtained.

Mattawoman Creek extends about 2 miles in a southeasterly direction and has several branches at its head. The best approach is to follow the lights at the entrance of Hungar Creek to the light off Wilsonia Neck, then follow the bush stakes southeastward and southward along the shore. The controlling depth is about a foot to the head of navigation. The overhead power cables near the head of the creek have minimum clearance of 29 feet.

A danger zone for naval firing begins about 12 miles north-northwestward of Cape Charles Harbor and extends northward to Tangier Sound Light; see 204.46, chapter 2, for limits and regulations.

Nassawadox Creek, 13 miles northward of Cape Charles Harbor, extends about 5 miles to the northeast. The controlling depth across the bar is about a foot, thence 4 feet for 4 miles upstream. The entrance channel is marked by a buoy and a light, and bush stakes mark the inside channel, but local knowledge is necessary to carry the best water. The flats on either side of the entrance are nearly bare at low water, are covered by marsh grass in the summer, and are usually well defined. The mean range of tide is 1.8 feet. Bayford, on the southeast side of the creek 1.5 miles above the mouth, has a wharf and a store. The several creeks that branch off from Nassawadox Creek have depths of 3 feet or less.

Occohannock Creek flows into Chesapeake Bay from eastward 18 miles northward of Cape Charles Harbor; a fixed bridge 5.4 miles above the entrance is the head of navigation. The centerline controlling depth is 5 feet to Morley Wharf, on the south side 4 miles above the entrance, with lesser depths to the fixed bridge. The mean range of tide is 1.7 feet.

The channel over the bar of Occohannock Creek is marked, but it is narrow and tortuous, and difficult to navigate without local knowledge. The channel within the creek also is narrow, but the ends of the shoals are marked by daybeacons all the way to Morley Wharf.

Nandua Creek, 23 miles northward of Cape Charles Harbor, has a controlling depth of 4 feet to the wharf in ruins at the settlement of Nandua, 3 miles above the mouth. The mean range of tide is 1.7 feet. The entrance channel is marked, but it is narrow and shifting; local knowledge is required to carry the best water. The shoals at the entrance usually can be distinguished by the difference in color of the water, except in rough weather

when the water is clouded. Daybeacons mark the critical parts of the channel to Nandua.

Back Creek, on the north side of Nandua Creek a mile above the mouth, has depths of 3 feet to the village of Hacksneck where some supplies are available.

Pungoteague Creek, 3 miles northeastward of Nandua Creek, has depths of 8 feet to the pier at Harborton, 2 miles above the mouth, and thence 4 feet to the ruins of Boggs Wharf, 3 miles above the mouth. Above this point the creek shoals rapidly. The entrance and inside channel are marked as far as Harborton. The mean range of tide is 1.7 feet. Barges load pulpwood at Harborton for delivery to West Point on York River.

**Chart 568.**—Onancock Creek, 38 miles north of Cape Charles, has considerable traffic in petroleum products and fertilizers. A marked channel with a controlling depth of about 12 feet leads across the entrance bar and up the creek to Onancock, 4.3 miles above the mouth. The mean range of tide is 1.8 feet.

A boatyard at Poplar Cove Wharf, 2.3 miles above the mouth of Onancock Creek, can haul out boats up to 40 feet in length for repairs. Gasoline can be obtained.

The anchorage basin in the entrance to Titlow Creek, just below Onancock, has depths of about 6 feet. North Branch, on the north side of Onancock, has depths of about 12 feet to the end of a turning basin 0.2 mile above the junction with Onancock Creek. Joynes Branch, on the south side of Onancock, has depths of about 6 feet to the bridge.

Water and electricity are available at the public dock at Onancock. Fuel and supplies can be delivered.

Chesconessex Creek, 2 miles northward of Onancock Creek, has depths of 8 feet in the approach channel and for a mile above the mouth to the middle of Tobacco Island, thence 4 feet to Chesconessex, 2 miles above the mouth, and 2 feet for 0.4 mile above the town. The creek is used by small local boats.

The approach to Chesconessex Creek from eastward of Watts Island Light is marked by buoys and a light; the channel above the entrance is marked by daybeacons and sometimes bush stakes. Gasoline is available at Chesconessex; a marine railway can haul out craft up to 30 feet in length for minor hull repairs.

The southern and main entrance to Pocomoke Sound, between the southern end of Watts Island and Beach Island Shoal Light (37°47.3' N., 75°50.3' W.), is 40 miles northward of Cape Charles. Extensive flats occupy most of the sound. A channel, wide and deep at the entrance but comparatively shallow in its most northerly part, leads to Pocomoke River, the most important tributary.

The shores of Pocomoke Sound are low and without prominent natural landmarks. The critical points along the main channel between the entrance and the mouth of Pocomoke River are marked by lights and buoys. The Virginia-Maryland boundary line is marked by white spar buoys.

The sound is used by many local oyster and fishing boats and by some tugs and barges. Small boats can enter from northwestward in Tangier Sound by way of Broad Creek, which is discussed later. The mean range of tide is about 2 feet in Pocomoke Sound; for current predictions, see the Tidal Current Tables.

A string of marshy islands and large shoals separates the lower part of Pocomoke Sound from Tangier Sound on the westward. Watts Island, southernmost of the string, is marshy and wooded. Watts Island Light is 1.5 miles south-southeast of the island.

**Little Fox Islands**, 5 miles northward of the entrance, are bare and marshy; the flats between these islands and Watts Island are very shallow and cannot be navigated without local knowledge. **Great Thorofare**, just northward of Little Fox Islands, has depths of 2 feet and is sometimes used by local boats.

**Great Fox Island**, 6 miles northward of the entrance to Pocomoke Sound, consists of a group of low islands, the northeasternmost of which is marked by a large building.

Just north of Beach Island Shoal Light, a crooked tributary marked channel with depths of 8 feet or more leads between shallow flats for 5 miles into a dredged channel of Deep Creek. The controlling depth in the marked channel is about 7 feet for 2.3 miles to the settlement of Deep Creek.

Deep Creek is used only by small local boats, many of which enter from Hunting Creek on the eastward by way of **The Notch**, a passage behind the 1.5-mile chain of islands which separates the outer parts of the two creeks; the controlling depth in The Notch is about 2 feet; the channel is marked by bush stakes.

Gasoline and supplies are obtainable at Deep Creek; diesel fuel is delivered by truck. A boatyard can haul out vessels up to 50 feet in length for minor repairs.

Another tributary channel, 3 miles northeastward of Beach Island Shoal Light, leads to **Hunting Creek** along the south side of **Guilford Flats** and southward through **The Thorofare** to the wharf at **Hopkins** on the east side of Hunting Creek, 2.5 miles above the mouth. The marked channel has depths of 7 feet or more to within 0.7 mile of Hopkins, thence 2½ feet to the wharf.

**Guilford Creek** is 2.5 miles northeastward of Hunting Creek, with which it has a common approach from the main channel as far as the inner buoy on the south side of Guilford Flats. The channel to Guilford Creek continues eastward along the flats, then turns northeastward and rounds a light off the mouth of the creek; the total distance from the main channel is about 8 miles and depths are 8 feet or more all the way. Within Guilford Creek the depths are 6 to 2 feet.

**Messongo Creek** empties into the east side of Pocomoke Sound 8 miles northeast of Beach Island Shoal Light. The marked approach to Messongo Creek is from west-southwestward. Depths of 7 feet at the mouth of the

creek shoal gradually to about 1 foot at the village of **Marsh Market**, 2.5 miles above. The creek is used only by small local boats.

**Starling Creek**, on the southeast side of Pocomoke Sound 10 miles above the south entrance, has a marked entrance channel with a controlling depth in 1966 of 4½ feet leading to a basin just inside. **Saxis**, on the northeast side of the creek, is the center of a considerable shellfish industry. Fuel can be obtained at the bulkhead and some groceries are available in the town.

**Charts 568, 1224.**—**Pocomoke River** flows into the northeast end of the Pocomoke Sound 15.5 miles above Beach Island Shoal Light. The river carries a large amount of petroleum products and fertilizer, and some fish products. The buoyed approach through Pocomoke Sound has depths of 7 feet or more for 12.5 miles above the southern entrance, then the route passes through a marked cut with a controlling depth of about 5 feet for 3 miles to the mouth of Pocomoke River. The cut is subject to continual shoaling and lesser depths may be found, particularly on the southerly side of the channel.

Pocomoke River has depths of 7 feet or more from the mouth for 14 miles to Pocomoke City, thence 5 feet or more for 12 miles to Snow Hill. Navigation is easy for 20 miles, but the remainder of the channel to Snow Hill is narrow and requires local knowledge to carry the best water. The mean range of tide is 2.4 feet at Shelltown and 1.4 feet at Pocomoke, but is considerably affected by winds. Freshets cause a rise of 1 to 5 feet at Snow Hill, but are not dangerous. The water is fresh above **Rehobeth**, 7.5 miles above the mouth.

**Shelltown** is a village on the west bank of Pocomoke River a mile above the mouth. Gasoline and some supplies can be obtained in the village. The landing is in poor condition.

**Pocomoke City**, on the east bank 14 miles above the mouth, has bus and rail communication, and all kinds of supplies. The bulkhead landings are in poor condition. The railroad bridge over the river at Pocomoke City has a swing span with a clearance of 4 feet; the best water is in the western opening. The overhead power cable 0.3 mile below the bridge has a clearance of 137 feet. The highway bridge 0.5 mile above the railroad bridge has a bascule span with a clearance of 3 feet. The fixed highway bridge a mile above the railroad bridge has a clearance of 35 feet.

A marina is at **Shad Landing** on the southeast bank 22 miles above the mouth. Gasoline and some supplies are available.

**Snow Hill**, the town on the east bank 26 miles above the mouth, has rail freight communication. The highway bridge just above the wharves has a 40-foot bascule span with a clearance of 2 feet; see 203.245, chapter 2, for drawspan regulations. The river is navigable for 2 miles above the bridge. Fuel and some supplies are available in the town.

A line of marshy islands and flats, with Tangier Island at the south end, separates Tangier Sound from Chesapeake Bay on the westward; the principal thorofares between the islands are Kedges and Hooper Straits. The danger zones south and west of Tangier Island have been described in chapter 11.

**Tangier Island** is low, sparsely wooded in the middle, and bare on the north and south ends. **Tangier** is the village midway along the eastern side of the island; a church spire is prominent. Oystering, crabbing, and fishing are the principal industries. Some supplies and fuel are available at Tangier. The island has telephone and motorboat communication with Crisfield.

**Tangier Sound Light** ( $37^{\circ}47.3' \text{ N.}$ ,  $75^{\circ}58.4' \text{ W.}$ ), 41 feet above the water, is shown from a white square tower on brown piles, in depths of 5 feet; a fog signal is at the light. The light is 53.3 miles above the Virginia Capes.

**Tangier Sound**, its main entrance a mile northeastward of Tangier Sound Light, affords a broad and deep channel extending the 28-mile length of the sound. Extensive flats border the sound, but the critical points are marked by lights and buoys.

The well-marked dredged channel to the town of Tangier is entered 3 miles north of Tangier Sound Light. The controlling depth is about 8 feet to the Tangier anchorage basin. A marine railway here can haul out craft up to 40 feet in length.

A 2,400-volt overhead power cable is considered a definite hazard to high-masted vessels using the Tangier basin. The cable line runs parallel to and about 300 feet north of the channel, and passes considerably closer to the basin.

The flats between Tangier Island and Smith Island, on the north, are shallow and can be navigated only by very small boats at high water; a line of telephone poles extends across the flats from island to island.

**Chart 555.**—**Smith Island** consists of a large group of marshy islands separated by narrow thorofares; travel from place to place is mostly by boat. **Tylerton**, **Ewell**, and **Rhodes Point** are small villages along the interior channels; oystering and fishing are the principal industries. Gasoline and some supplies can be obtained at the villages. The island has telephone and motorboat communication with Crisfield. A marine railway at Rhodes Point can haul out boats up to 40 feet in length for hull repairs.

A well marked 5-mile dredged channel extends from Tangier Sound through **Big Thorofare** to Ewell, thence northwestward in **Levering Creek** and again through **Big Thorofare** to Chesapeake Bay; the controlling depth is about  $4\frac{1}{2}$  feet to Ewell and thence 7 feet to Chesapeake Bay. The eastern end of the channel is 11 miles north of Tangier Sound Light. A marked channel from **Big Thorofare** through **Tyler Ditch** to Tylerton has a controlling depth of 3 feet. An overhead power cable across **Tyler Ditch** just north of Tylerton has a clearance of 72 feet.

Another marked channel from Tylerton to **Rhodes Point** has a controlling depth of 4 feet. Local fishermen in shallow-draft boats sometimes approach Tylerton from southward at high water, leaving the main channel in Tangier Sound 7 miles north of Tangier Sound Light and following the deeper water northward into **Tyler Creek**. The depth in the southern approach is about 4 feet.

Several thorofares with depths less than 3 feet lead westward from the interior of Smith Island into Chesapeake Bay; the principal thorofare leads to Rhodes Point and is marked on the north side of the bay entrance. Navigation of all these channels requires local knowledge.

**Kedges Straits**, between Smith Island on the south and uninhabited **South Marsh Island** on the north, is used by vessels bound from northward in Chesapeake Bay to points southward of Manokin River in Tangier Sound. The inner approach to the straits is about 16 miles north of Tangier Sound Light. A depth of 10 feet can be carried through the straits.

**Holland Island Bar Light** ( $38^{\circ}04.1' \text{ N.}$ ,  $76^{\circ}05.7' \text{ W.}$ ), 37 feet above the water, is shown from a white hexagonal tower on piles in depths of 9 feet on the north side of the bay approach to Kedges Straits; a fog signal is at the light, which is 6.3 miles due east of a point on the bay ship channel 72.6 miles above the Virginia Capes.

**Solomons Lump Light** ( $38^{\circ}02.9' \text{ N.}$ ,  $76^{\circ}00.9' \text{ W.}$ ), 47 feet above the water, is shown from a white octagonal dwelling, with a square tower, on a brown cylinder, in depths of 7 feet on the Smith Island side of Kedges Straits; a fog signal is at the light.

The mean range of tide in Kedges Straits is 1.7 feet but it is affected considerably by winds. Easterly winds raise the water and northwesterly winds lower it sometimes as much as 2 feet below the normal level. In severe winters, floating ice makes navigation of the straits dangerous.

**Holland Straits**, on the north side of Kedges Straits between **South Marsh Island** on the south and **Bloodsworth Island** and other smaller uninhabited low marshy islands on the north, is generally shallow and should not be used without local knowledge. Sand bars obstruct the Chesapeake Bay side and patches of eel grass uncover in the Tangier Sound entrance on the lower tides. **Bloodsworth Island** is within a danger zone for naval firing and bombing; see 204.36, chapter 2, for limits and regulations.

**Hooper Strait**, between **Bloodsworth Island** on the south and **Hooper Islands** and **Bishops Head** on the north, is the most northerly direct passage from Chesapeake Bay into Tangier Sound and is used by vessels bound from northward in the bay to tributaries at the north end of the sound. The inner approach to the strait is 27 miles north of Tangier Sound Light.

The narrow, crooked channel through **Hooper Strait** has a controlling depth of about 12 feet. The shoals on each side are well marked; strangers should have little

difficulty if they pay close attention to the chart. **Hooper Strait Light** ( $38^{\circ}13.6' \text{ N.}, 76^{\circ}04.5' \text{ W.}$ ), 41 feet above the water, is shown from a white hexagonal house on piles in depths of 9 feet midway along the north side of the channel; a fog signal is at the light. **Sharkfin Shoal Light** ( $38^{\circ}12.1' \text{ N.}, 75^{\circ}59.2' \text{ W.}$ ), 44 feet above the water, is shown from a skeleton tower on piles in depths of 7 feet on the south side of the approach from the main channel in Tangier Sound; a fog signal is at the light.

The mean range of tide is 1.7 feet at Hooper Strait Light and 2.2 feet at Sharkfin Shoal Light, but in the fall and winter continual northerly winds may lower the water as much as 2 feet below normal level. The current velocity is about 1.5 knots; the current floods eastward through Hooper Strait. In the winter vessels navigating Hooper Strait are in danger from running ice.

**Charts 555, 568.**—**Little Annemessex River**, the approach to the town of Crisfield, empties into Tangier Sound 10 miles north of Tangier Sound Light. The entrance to the river is 0.8 mile wide between **Great Point** on the south and **Island Point** on the north.

The main entrance to Crisfield is through the well marked channel of Little Annemessex River; the controlling depth is about 9 feet. The spur channel to the wharves at **Hop Point** has depths of  $3\frac{1}{2}$  feet, and the T-shaped channel and mooring basin a half mile northward have depths of 7 feet.

The southerly approach to Crisfield from Pocomoke Sound, used extensively by oyster boats, is through crooked **Broad Creek**; the controlling depth of the marked channel is about 6 feet. The northerly approach from **Big Annemessex River** is through **Annemessex Canal**, marked at both ends; the controlling depth is about 4 feet. The tidal current floods northward in the canal and ebbs southward; the velocity is reported to be about 1.3 knots.

The mean range of tide in Little Annemessex River is 2 feet. The current velocity is 0.9 knot.

**Jenkins Creek**, which enters Little Annemessex River close northeastward of Broad Creek, is used by fishermen and crabbers. Depths of 3 feet can be carried 0.5 mile above the mouth of the creek, thence 2 feet for 0.5 mile farther to the highway bridge with a 16-foot fixed span and a clearance of 6 feet; small boats pass through the bridge to piers on the north shore.

**Crisfield**, on the east side of Little Annemessex River 2 miles above the mouth, is a fishery and seafood processing center. Waterborne commerce consists chiefly of seafood and petroleum products. The harbor is used by many oyster, fish, and crab boats with drafts of 2 to 6 feet. Small freight and passenger boats operate daily to Tangier and Smith Islands.

See appendix for storm warning displays.

Crisfield is a customs port of entry at which marine documents are issued; an outpatient office of the Public Health Service is here.

The Crisfield waterfront is largely built up with bulkhead wharves and timber piers, most of which are privately owned but open to the public on equal terms. Some of the terminals have mechanical freight-handling equipment, but most of the freight is transferred by hand. Depths at the wharves and piers range from 5 to 12 feet, the deepest being at the outer end of the railroad pier.

**Somers Cove**, a well protected basin on the south side of Crisfield, has a controlling depth of about 10 feet in the entrance channel and basin. It is necessary to make a sharp turn into the basin at the entrance light. A marina is on the north side and a Coast Guard station is on the south side of the cove.

Supplies and fuel are available at Crisfield. The largest marine railway can haul out vessels up to 135 feet in length for repairs.

**Chart 555.**—**Big Annemessex River** joins Tangier Sound 15 miles north of Tangier Sound Light. The river has depths of 8 feet for 4 miles, thence 5 feet for 1 mile, and thence 3 feet for 1 mile. The channel is marked as far as Colbourn Creek. The mean range of tide is 2.1 feet.

**Annemessex Canal**, already described, enters the south side of Big Annemessex River 1.3 miles above the mouth. **Jones Creek**, close eastward of the canal, has depths of 2 feet for about 1.5 miles above the mouth, but the channel is narrow, crooked, and unmarked.

**Colbourn Creek**, on the south side of Big Annemessex River 3.5 miles above the mouth, has depths of 4 feet for about 0.7 mile, thence 2 feet for 0.5 mile. Excellent storm anchorage with good holding ground is available in depths of 5 feet in midstream 0.3 mile above the entrance.

**Manokin River**, on the east side of Tangier Sound 16 miles north of Tangier Sound Light, is directly across the sound from Kedges Straits, described earlier. The entrance to the river is 3.5 miles wide between **Hazard Point** on the southeast and low **Little Deal Island** on the northwest, but is obstructed by numerous shoals.

The main channel of Manokin River is narrow and crooked, and favors the southeast shore. The channel has depths of about 9 feet to abeam of **St. Pierre Island**, on the north side 4 miles above the mouth, thence 6 feet to within 0.5 mile of **Locust Point**, on the northwest side 7 miles above the mouth, and thence 1 foot to **Princess Anne**, 15 miles upstream. The channel is marked as far as **Inverness**, on the south side 6 miles above the mouth, where gasoline is available. The lower of the two fixed highway bridges, 14 miles above the mouth, has a clearance of 3 feet. The mean range of tide in Manokin River is 2.1 feet. Most of the piers and wharves along the river are in poor condition.

**St. Peters Creek**, on the north side of Manokin River 5.5 miles above the mouth, has a 6-foot marked channel leading to a basin and public wharf a mile above the en-

trance. The creek is used mostly by fishing boats. A gasoline pier and small store are near the wharf.

A marked channel with a controlling depth of about 7 feet, 21 miles north of Tangier Sound Light, leads through **Lower Thorofare** between **Little Deal Island** and **Deal Island** to a mooring basin with bulkhead and several small piers at **Wenona**. Gasoline and some supplies can be obtained in the fishing village.

Another marked channel with a controlling depth of about 9 feet, 25 miles north of Tangier Sound Light, leads through the west end of **Upper Thorofare** to an anchorage basin at the north end of Deal Island. A wreck with 2 feet over it lies in the northwest corner of the basin. The highway bridge across the north end of the thorofare has a 20-foot fixed span with a clearance of 10 feet. On the northwest side of the bridge is an overhead power cable with a clearance of 34 feet, but there is sufficient water for some high-masted vessels to drift close enough to touch the wires; extreme caution should be observed. A marina just east of the bridge has a marine railway that can haul out boats up to 40 feet in length. Gasoline and some supplies are available. Beyond the bridge, least depths are about a foot southeastward for 2.5 miles to Manokin River.

**Chart 554.**—Wicomico River flows into the north end of Tangier Sound eastward of the inner approach to Hooper Strait, described earlier, and 26 miles north of Tangier Sound Light. The entrance to Wicomico River is 1.5 miles wide between **Long Point** on the south and **Nanticoke Point** on the north. Waterborne commerce is largely in petroleum products, but there is also sizable traffic in commodities, sand and gravel, fertilizer, and shellfish.

The controlling depth is about 14 feet in the marked channel in Wicomico River from the entrance to Salisbury, except for an 11-foot rocky shoal in the westerly half of the channel at **Bitter Head Point**, 19 miles above the mouth.

**Great Shoals Light** ( $38^{\circ}12.8' \text{ N.}$ ,  $75^{\circ}52.8' \text{ W.}$ ), 37 feet above the water, is shown from a white square tower on piles in depths of 4 feet on the north side of the channel, 0.5 mile above the mouth; a fog signal is at the light.

The mean range of tide in Wicomico River is 2.3 feet at the entrance and 3 feet at Salisbury. Strong tidal currents set across the main channel off Monie Bay; the current velocity in the entrance to the river is 0.6 knot on the flood and 0.9 knot on the ebb. Ice usually forms on the river as far down as Whitehaven; in ordinary winters the channel usually is open to navigation, but in severe winters it is often closed for extended periods.

**Monie Bay** is a large cove on the southeast side close within the mouth of Wicomico River. The bay has depths of 4 feet to the head, but is used only by small local boats.

A marine railway on **Semi Point**, on the south side of Wicomico River 2 miles above the mouth, can haul out boats up to 40 feet in length for repairs.

**Webster Cove**, on the south side 3.5 miles upriver, is entered by a marked channel with a controlling depth of about 5 feet leading to a public wharf inside. Gasoline is available.

**Whitehaven**, on the north bank 6.5 miles above the entrance, has some supplies and gasoline. Most of the docks are in poor condition. A marine railway can haul out boats up to 150 feet in length. The cable ferry operates during daylight hours only; the cables rest on the bottom when the ferry is tied up.

**Wicomico Creek**, on the south side of Wicomico River 8.5 miles above the mouth, is navigable for small craft for several miles. The marked entrance channel has a controlling depth of about 4 feet with deeper water inside.

A small marina on the north side of the entrance has gasoline and some supplies. The cable ferry about a mile above the mouth operates daily except Sundays in daylight hours only, and drops its cable when tied up.

At **Upper Ferry**, 15 miles above the mouth of Wicomico River, a cable ferry operates during daylight hours only; it drops its cables when tied up. Fishing boats use the large wharf on the south bank, 16.5 miles above the mouth; water is available. An overhead power cable, 17.7 miles above the mouth, has a clearance of 137 feet.

**Shad Point**, 18 miles above the mouth on the southeast side, has a boatyard that can haul out craft up to 75 feet in length for minor repairs. Gasoline and some supplies are available.

**Salisbury**, the head of navigation 20 miles above the mouth, is a major trading center of the eastern shore. Wicomico River forks at the city; the **North Prong** has a controlling depth of about 11 feet to the fixed bridge 0.4 mile upstream, but **South Prong** is used only by small boats to the first bridge. The two highway bridges over the entrance to North Prong have 40-foot wide bascule spans with a minimum clearance of 1 foot; see 203.245, chapter 2, for drawspan regulations.

Most of the commercial wharves and oil terminals are in the North Prong. Fuel and supplies are available at Salisbury. The largest marine railway, at a boatyard 0.4 mile below the forks, can haul out vessels up to 150 feet in length for repairs.

**Nanticoke River** flows into the north end of Tangier Sound 29 miles north of Tangier Sound Light. Waterborne commerce is mostly in petroleum products, but there is also sizable traffic in fertilizers, corn, soybeans, pulpwood, shellfish, and shells.

**Mileages** on Nanticoke River, such as Mile 11W, 19.6E, etc., are the nautical miles above the entrance which is between Nanticoke Point on the east side, and **Clay Island** on the west. The letters N, S, E, or W following the numerals indicate the side of the river by compass direction where each feature is located.

The controlling depth of the marked channel in Nanticoke River to the highway bridge at Seaford, Del., is about 8 feet. A depth of about 11 feet can be carried to

Sharptown with local knowledge. From the mouth to Wetipquin Creek, the river is more than a mile wide, and is obstructed by extensive shoals, most of which are marked. The deepest water is usually near the points rather than in the bends.

The mean range of tide in Nanticoke River is 2.3 feet at the entrance and at Vienna. The current velocity is 1.2 knots in the entrance. The water is fresh above Vienna. Ice forms on the river in winter, but ordinarily there is enough traffic to keep the channel open. Spring freshets do not interfere with navigation.

**Nanticoke**, Mile 2.5E, has several packing plants. A marked channel with a controlling depth of about 3 feet leads to a small-boat harbor, protected by jetties, at the village. Gasoline and some supplies are available; marine railways can haul out craft up to 40 feet in length for repairs.

**Bivalve** is at Mile 5.4E. A marked channel with a controlling depth of about 4½ feet leads to a jettied basin for skiffs and oyster boats 0.4 mile northeastward of the village.

**Wetipquin Creek**, Mile 7.0E, has depths of 4 feet to the wharf at Tyaskin on the south side of the creek just inside the entrance; gasoline and some supplies are available.

**Vienna**, Mile 19.6W, has a grain dock and a bulkhead wharf. A Coast Guard station is 0.2 mile below the bridge. Gasoline and some supplies can be obtained nearby.

The highway bridge over Nanticoke River at Vienna has a bascule span with a clearance of 18 feet. The overhead power cable crossing the river at the electric power plant 100 yards above the bridge has a clearance of 135 feet.

**Marshyhope Creek**, Mile 24.1W, has depths of 5 feet to the Harrison Ferry bridge, 9 miles above the entrance, above which point the creek is obstructed by snags and debris. The highway bridge at **Brookview**, 5 miles above the entrance, is kept in a fixed position with a clearance of 11 feet; see 203.245, chapter 2.

**Sharptown**, Mile 26.1E, has a mill and cannery. Pulpwood is loaded here for West Point on York River. Gasoline and some supplies are available. The highway bridge over the river at the town has a swing span with a clearance of 7 feet.

**Broad Creek**, Del., Mile 29.0E, has a controlling depth of about 8 feet to Laurel. The highway bridge at **Bethel**, 3.5 miles above the entrance, has a swing span with the south opening obstructed; the north opening has a clearance of 2 feet. **Laurel**, on the south side 6 miles above the entrance, has a fertilizer plant and several mills. Gasoline and some supplies are available. The railroad bridge at Laurel has a swing span with the north opening obstructed; the south opening has a width of 40 feet and a clearance of 14 feet. Between this bridge and the dam, 0.3 mile upstream, are three drawbridges which have a minimum width of 32 feet and clearance of 2 feet. See

203.245, chapter 2, for drawspan regulations of bridges over Broad Creek.

The vehicular cable ferry over Nanticoke River at **Woodland**, Mile 31.3W, operates daytime only, and drops cables when not crossing. Just above the ferry lane, on the west bank, gasoline and some supplies are available; a marine railway can haul out boats up to 40 feet in length for minor repairs.

A power cable crossing at Mile 33.7 has a clearance of 75 feet.

**Seaford**, Del., Mile 34.7N, has several mills and factories. The railroad bridge at Mile 34.4 has a swing span with a width of 47 feet in the southeast opening and a clearance of 1 foot; see 203.245, chapter 2, for drawspan regulations. A strong crosscurrent runs under the bridge.

The highway bridge at Mile 34.7 has a 40-foot bascule span with a clearance of 3 feet. Depths of 7 feet are said to extend 1.5 miles above the highway bridge, and small boats can go to a milldam 5 miles from the bridge, but there is little traffic above Seaford. Fuel and some supplies are available in the town.

**Fishing Bay** is at the north end of Tangier Sound 28 miles north of Tangier Sound Light. The entrance to the bay is 3 miles wide between Clay Island on the east and **Bishops Head Point** on the west. The partially marked channel in Fishing Bay has depths of 9 feet for 2 miles, thence 13 to 30 feet for 4 miles, and thence 4 to 3 feet to the head, 9 miles above the mouth.

**Tedious Creek**, on the west side of the bay 2 miles above Bishops Head Point, has depths of 4 feet for 0.5 mile from the mouth, then for 0.7 mile shoals gradually to 1 foot at the head. The cove at **Crocheron**, a village on the south side of the creek just inside the entrance, has several small piers which are obstructed by stakes and crab pounds. The depth to the gasoline pier is about 2 feet.

**Goose Creek**, on the west side of Fishing Bay 3 miles above the entrance, has a marked channel with a controlling depth of about 6 feet to the wharves just inside: gasoline is available. **McCreadys Creek**, on the east side of Fishing Bay 4 miles above the entrance, has a channel with a controlling depth of about 4 feet to the wharves just inside.

**Farm Creek**, on the west side of Fishing Bay 5 miles above the entrance, has a marked channel with a controlling depth of about 6 feet to the wharves at **Toddville**, on the south side of the creek 0.6 mile upstream. Depths of about 3 feet have been reported at the entrance to the basin at the village. Gasoline is available.

**Honga River** extends northwestward from the western part of Hooper Strait for 14 miles between the mainland on the northeast and the Hooper Islands on the southwest; the river is more than a mile wide for most of its length. Honga River has a sizable traffic in shellfish and shellfish products.

The southern and main entrance to Honga River is between Hooper Strait Light on the east and Honga River Light on the west. The narrow crooked channel in the river has depths of 13 to 55 feet as far as **Wroten Island**, on the east side 8.5 miles above the southern entrance, and thence 8 feet for 1.5 miles to the improved channel, described later, leading northwestward and westward to Fishing Creek. Depths northward of the Fishing Creek channel are 4 to 5 feet, shoaling gradually to 2 feet at the head. The river is marked as far as Fishing Creek.

**Fox Creek** is on the northeast side of Honga River 2.5 miles above the entrance. A light marks the east side of the creek entrance and a daybeacon marks the point of a shoal that extends southeastward from **Paul Point**. The creek has depths of 8 feet to a line from Paul Point to **Wingate Point**, on the east side 2 miles above the entrance, then shoals gradually to 3 feet at the head, a mile farther up.

**Duck Point Cove**, on the east side just inside the entrance of Fox Creek, has general depths of 2 to 5 feet. The marked channel into **Hearns Cove**, on the north side of Duck Point Cove, has a controlling depth of about 4 feet to the basin at **Wingate**. The oyster-packing plants here have small wharves for the oyster boats. Gasoline is available.

A dredged 2-foot channel marked by private stakes leads to a marine railway in **Insley Cove** at the northeastern end of Fox Creek; boats up to 50 feet in length can be hauled out for hull repairs.

The three **Hooper Islands** divide Honga River from Chesapeake Bay and Tar Bay. Middle and Upper Hooper Islands are connected with each other and with the mainland by bridges. **Hoopersville** is a village with general stores and packing plants on Middle Hooper, 3.5 miles above the southern entrance of Honga River. The wharf at the village is owned by a fish company.

The highway bridge over the passage between Middle and Upper Hooper Islands, at **Ferry Point**, has a swing span 25 feet wide with a clearance of 6 feet; the draw is opened from sunrise to sunset. The marked passage through the bridge from Honga River to Chesapeake Bay has a controlling depth of about 2 feet, but greater depths can be carried with local knowledge.

**Back Creek**, midway along the inner side of Upper Hooper Island 8.8 miles above the river mouth, has a marked channel with a controlling depth of about 7 feet leading to a basin at the upper end. Oyster houses and a marine railway are along the creek; boats up to 50 feet in length can be hauled out for repairs. Gasoline and some supplies can be obtained on Upper Hooper Island. See appendix for storm warning displays.

**Charts 553, 554.**—A 4-mile dredged channel marked by lights leads from the upper part of Honga River, 10.3 miles above its mouth, through Fishing Creek and Tar Bay to Chesapeake Bay. The controlling depth is about 7 feet, except at the western entrance where shoaling to about 1 foot has been reported.

**Fishing Creek** lies between Upper Hooper Island and **Meekins Neck**. The highway bridge over the creek has a swing span with a width of 28 feet and a clearance of 6 feet; the draw is opened from sunrise to sunset. The overhead power cable just west of the bridge has a clearance of 65 feet. The mean range of tide is 1.3 feet. The current velocity is estimated to be 3 knots. A public wharf and several private wharves are along the creek. The largest marine railway can haul out boats up to 55 feet in length for repairs; some supplies can be obtained at **Honga**, on the south side at the bridge. A marina 0.3 mile west of the bridge has fuel and berths; the narrow entrance channel marked by bush stakes has depths of about 3 feet.

**Tar Bay**, west of Meekins Neck and Upper Hooper Island, is separated from Chesapeake Bay by Barren Island and a smaller island to the northward. The bay is shallow and unimportant except for the channel that leads through it from Honga River to Chesapeake Bay.

**Chart 551.**—**Sharps Island Light** ( $38^{\circ}38.3' N.$ ,  $76^{\circ}22.5' W.$ ), 54 feet above the water, is shown from a brown tower on a cylindrical pier, in 10 feet at the north end of a shoal with depths as shallow as 2 feet; a fog signal is at the light. The light is 2.9 miles due east of a point on the bay ship channel 108.2 miles above the Virginia Capes. A daybeacon, 1.4 miles south-southeast of the light, marks a group of rocks, sometimes awash at low tide, which are all that remains of **Sharps Island**. **Little Choptank River** joins the eastern side of Chesapeake Bay 6 miles south-southeastward of Sharps Island Light. Although obstructed by shoals, the river has depths of 11 feet in a crooked channel for 7 miles and the tributaries have depths of 5 feet for considerable distances. The river is marked as far as Fishing Creek, above which it is difficult to carry more than 7 feet without local knowledge. The tributary channels are usually marked by bush stakes, but navigation is difficult without some local information.

The mean range of tide in the entrance to Little Choptank River is 1.4 feet. The current velocity is 0.4 knot. The river carries some commercial traffic in shellfish and shells.

The entrance to Little Choptank River is between **James Island** on the southwest and **Hills Point** on the northeast. James Island is subject to rapid erosion. Good anchorage is available in depths of 12 to 18 feet in the bight between James Island and **Hooper Point**, which is on the west side of the entrance to Slaughter Creek.

**Slaughter Creek** (chart 553), on the south side of Little Choptank River 4 miles above the mouth, has depths of 4 feet over the bar marked by lights, thence 6 feet to the bridge at the village of **Taylor's Island**, 2 miles above the entrance. The creek is used by oyster tongs and crab fisherman. A marina on the east side of the creek just north of the bridge has gasoline, some supplies, and slips; a marine railway can haul out boats up to 40 feet in length for repairs.

**Brooks Creek**, on the north side of Little Choptank River 5 miles above the mouth, has depths of 10 to 4 feet in a narrow channel for 2 miles then depths decrease to 2 feet at the head. The narrow entrance is marked, but local knowledge is required to carry the best water. Gasoline is available on the west side of the creek about midway along Hills Point Neck. A marine railway can haul out boats up to 40 feet in length for repairs.

**Hudson Creek**, on the north side of Little Choptank River 6 miles above the mouth, has depths of 5 feet for 3.2 miles to just below **Hudson**, a village at the head. The entrance is marked and the upper reaches usually are bush-staked. The wharves at Hudson are in poor condition; grass growth is prevalent in the creek at the village.

**Madison Bay**, on the south side of the river opposite Hudson Creek, has depths of 6 to 8 feet for 1 mile, thence about 2 feet for 0.5 mile to **Madison**, a village at the head. There is a small wharf at Madison; gasoline and some supplies are available.

**Fishing Creek**, on the southeast side 7 miles above the river mouth, has a controlling depth of 5 feet for 4 miles to the forks at the head. The channel is narrow and crooked, and difficult to navigate without local knowledge. There are several small piers along the creek which is used extensively by boats bound for Church Creek, the principal tributary. The entrance is marked by buoys, and the upper reaches usually are marked by bush stakes. The **Northeast** and **Southeast Branches** have depths of 3 feet. A boatyard on the Southeast Branch can haul out boats 45 feet in length for repairs.

**Church Creek**, on the south side of Fishing Creek 2.5 miles above the latter's mouth, has depths of 6 feet for 0.8 mile, thence 4 feet for 0.8 mile, and thence 1 to 3 feet for 0.3 mile to **Church Creek**, a village near the head. Gasoline and some supplies are available.

Other tributaries of Little Choptank River have depths of 2 to 5 feet, and are used by small local boats.

**Choptank River**, which flows into Chesapeake Bay 2 miles eastward of Sharps Island Light, is navigable for 53.4 miles to the town of Greensboro. Traffic on the river consists chiefly of petroleum products, fish and shellfish, shells, grain, soybeans, and fertilizer.

**Mileages** on Choptank River, such as Mile 8N, 13S, etc., are the nautical miles above the entrance between Blackwalnut Point on the north and Hills Point on the south. The letters N, S, E, or W, following the numerals indicate by compass direction the place where each feature is located.

The principal approach to Choptank River is from southward through a buoyed channel commencing 6 miles southward of Sharps Island Light; the controlling depth is about 25 feet. The approach from northward, between designated fishtrap areas, has a least depth of 10 feet.

The Choptank River main channel has depths of 19 to 25 feet to Cambridge, 15 miles above the mouth, thence a controlling depth of 6 feet to within a mile of Greens-

boro, 53.4 miles above the entrance, and thence 2½ feet to the fixed bridge at Greensboro. The channel is marked as far as Denton.

The mean range of tide is 1.6 feet at Cambridge, 2.2 feet at Denton, and 2.5 feet at Greensboro. The river water is fresh above the town of Choptank. The current velocity is about 0.7 knot in the entrance off Cook Point. In Choptank and Tred Avon Rivers the current velocity is less than 1.0 knot.

Two miles above Hills Point, on the south side of the entrance, is shallow **Trippe Bay** which is little used except by small oyster and fishing boats. The channel to **Brannock Bay** is buoyed.

**Tilghman Island**, north of the entrance to Choptank River, has a substantial crabbing, oystering, and fishing industry. The island, 3 miles long in a north-south direction, is subject to rapid erosion on its western side.

**Blackwalnut Cove**, at the south end of Tilghman Island, is well sheltered except from the south, and is used extensively by small boats. A marked channel with a controlling depth of 1½ feet in 1965 leads to a basin at the upper end of the cove. The mean range of tide is 1.3 feet. A public pier at the south end of **Fairbank** has depths of 3 feet at the outer end.

**Dogwood Harbor**, on the eastern side of Tilghman Island, has depths of 7 feet to the packing-plant wharf at **Avalon**.

**Knapps Narrows**, between the mainland and the northern end of Tilghman Island, affords passage from Choptank River to Chesapeake Bay. The marked channel through the narrows has a controlling depth of about 9 feet. Note that the system of marking is from each entrance and reverses at the bridge. The highway bridge over the narrows has a bascule span with a clearance of 7 feet. The mean range of tide is 1.3 feet.

The village of **Tilghman** is on the south side of Knapps Narrows. The bulkheaded sides of the turning basin on the west side of the southerly abutment of the bridge are available for public use. A marina and boatyards are on the south side of the narrows. Supplies and gasoline are available; repairs are made. Largest haul-out capacities are: railway, 55 feet; lift, 20 tons.

**Harris Creek** empties into Choptank River at Mile 2.3N, along the east side of Tilghman Island. The channel has depths of 10 feet, with local knowledge, and is marked as far as Cummings Creek, 5.5 miles above the mouth. Above this point the narrow and crooked channel has depths of 6 feet to the forks, thence 5 feet in a channel marked by private stakes for 1 mile up **Northeast Branch** (chart 550), and thence 2 feet for 1 mile to the head of the branch, 9 miles above the mouth of the creek. **Northwest Branch** (chart 550) also extends about 2 miles from the forks, and has a controlling depth of about 2 feet to its head.

**Sherwood** is a village on the west side of Harris Creek 4.5 miles above the mouth. The county wharf at the village, available for public use, has depths of 3 feet along-side.

**Cummings Creek** empties into the northwest side of Harris Creek 5.5 miles above the mouth. A depth of about 5 feet can be carried up Cummings Creek to the county wharf at Wittman (chart 550). The larger of two boat-yards along the prongs just eastward of Cummings Creek can haul out boats up to 45 feet in length for hull repairs.

**Broad Creek**, Mile 4.4N, has depths of 16 feet as far as **Edge Creek**, on the east side 3 miles above the mouth. Above Edge Creek, the winding channel has depths of 9 feet for 3 miles, then shoals gradually to depths of 2 feet at the head, 7.5 miles above the entrance. The wide entrance channel is marked, but some local knowledge is needed in the narrow unmarked upper reaches.

**Balls Creek**, on the west side of Broad Creek 1 mile above the entrance, has depths of 6 to 7 feet almost to its head; the narrow entrance is marked by a light and the channel by daybeacons. Neavitt is a village on the southwest side near the head.

**St. Michaels**, a town with its main waterfront on Miles River, can be reached from Choptank River by way of Broad Creek, thence southeastward in Edge Creek for 0.7 mile, and thence northward in San Domingo Creek for 2.3 miles to its head, 6 miles from the mouth of Broad Creek. San Domingo Creek has depths of 7 feet or more for most of its length, and a controlling depth of 4 feet to St. Michaels.

**Irish Creek**, Mile 4.7N, has depths of 7 feet for 1.4 miles, then shoals gradually to 2 feet at its head, 2 miles above the entrance. The narrow approach channel is marked by buoys. The creek is used only by small local boats.

**Tred Avon River**, Mile 7.9N, has natural depths of 16 feet or more for 5 miles, thence 11 feet for 1 mile to **Peachblossom Creek**, and thence about 8 feet to Easton Point, 8.5 miles above the mouth. The channel is marked as far as the shoals extending off **Watermelon Point**, on the east side 7 miles above the mouth; above this point midchannel courses can be steered. Caution should be exercised if going beyond Easton Point because of abrupt shoaling. The mean range of tide is 1.6 feet. Traffic in the river consists chiefly of petroleum products and shellfish.

**Choptank River Light** (38°39.4' N., 76°11.1' W.), 35 feet above the water, is shown from a skeleton tower on piles in depths of 10 feet 0.6 mile outside the entrance to Tred Avon River; a fog signal is at the light.

Small motorboats can find anchorage near midchannel of any of the larger tributaries of Tred Avon River. The river bottom is quite firm but the bottom in the tributaries is mostly soft mud. There is usually excellent protection from the wind; the brush and trees that line most of the banks provide some protection.

**Oxford** is on the east side of Tred Avon River, 2 miles above the mouth. The principal facilities are along Town Creek on the east side of the town. A marina on

the river side, 2 miles above Choptank River Light, has gasoline and slips; the marked entrance channel has a controlling depth of about 4 feet. The ferry landing on the river side of Oxford has depths of 14 feet at the face. Year-round ferry service is maintained to Bellevue, on the opposite side of the river, from 6:30 a.m. to sunset daily and Sundays from April 1 through December 1. A public landing nearby has fuel.

**Town Creek** enters Tred Avon River east of Oxford and comprises the waterfront area of the town. A marked channel with depths of 10 to 6 feet leads to the head of the creek. The mean range of tide is 1.4 feet.

The several packing houses have wharves along the west bank of Town Creek, and small piers are scattered on both sides. Supplies, fuel, and slips are available. The largest shipyard can haul out vessels up to 100 feet in length for repairs.

**Bellevue**, across the river from Oxford, is the site of several oyster-packing plants in ruins but prominent as landmarks. There are no facilities for mooring.

**Easton Point**, at the head of Tred Avon River 8.5 miles above the mouth at the junction of **North Fork** and **Papermill Pond**, is a mile west of Easton. Bulkhead wharves of the oil terminals are on the point. A marina here has gasoline, some supplies, and slips. A 6-ton lift can haul out boats for repairs.

**Island Creek**, Mile 8.3E, has a natural channel through the bar with a depth of about 5 feet. The entrance is marked.

**Lecompte Bay**, Mile 10.0S, has depths of 7 to 13 feet. A narrow channel with a controlling depth of about 4 feet leads to a boatyard 0.5 mile inside Lecompte Creek on the west side of the bay. A marine railway can haul out boats up to 50 feet in length for repairs; gasoline is available.

**La Trappe Creek**, Mile 10.6N, has depths of 10 feet for 0.5 mile, thence 5 feet to the bulkhead at **Trappe Landing**, 3 miles above the mouth. The entrance is marked.

**Cambridge**, Mile 15.2S, is the center of a large agricultural area with related industries serving the Delmarva Peninsula. Waterborne commerce consists chiefly of tuna fish from both Atlantic and Pacific ocean fishing grounds; local fish and shellfish, petroleum products, fertilizers, grains, and soybeans. The town has railroad freight and truck services.

A marked channel with a controlling depth of about 25 feet leads from deeper water in Choptank River to the **Cambridge Marine Terminal** and turning basin on the south side of the entrance to **Cambridge Harbor**. The channel through Cambridge Harbor has a controlling depth of about 12 feet to the head, 0.7 mile above the entrance. Most of the waterfront facilities inside the harbor have depths of 8 to 12 feet alongside. The mean range of tide is 1.6 feet. The highway bridge 0.3 mile above the harbor entrance has a bascule span with a

clearance of 8 feet; see 203.270, chapter 2, for drawspan regulations.

Cambridge is a customs port of entry and marine documents are issued. The U.S. Public Health Service maintains an outpatient office in the city.

Cambridge Marine Terminal has a 500-foot marginal wharf extended an additional 150 feet by a catwalk and two mooring dolphins; depths of 25 feet are alongside. The terminal has rail and highway connections, warehouse, and open storage. Water is piped to the wharf.

Fuel and supplies can be obtained at Cambridge. The largest shipyard can handle vessels up to 120 feet in length for repairs.

A channel with a controlling depth of about 5 feet leads to the municipal boat basin just westward of Cambridge Harbor; gasoline is available. The Cambridge Yacht Club is on the north side of the basin. See appendix for storm warning display.

**Chart 552.**—The highway bridge over Choptank River at the southeast side of Cambridge, Mile 15.5, has a swing span with a clearance of 18 feet.

**Warwick River**, Mile 20.4E, has a channel with a controlling depth of about 8 feet to Secretary, a mile above the entrance; the entrance is marked. Gasoline is available at the bulkhead wharves. A marine railway on the south side of the entrance to the river can haul out boats up to 60 feet in length for repairs; gasoline is available.

**Cabin Creek**, Mile 22.6E, has depths of 5 feet to the fixed highway bridge 1 mile above the entrance, thence 2 feet for 0.5 mile nearly to the head. The bridge has a width of 17 feet and a clearance of 7 feet. Gasoline is available at a small marina just below the bridge.

**Hunting Creek** at Mile 25.2E has depths of 3 feet for 3 miles to a fixed highway bridge. The fixed highway bridge 0.4 mile above the entrance has a width of 17 feet and a clearance of 7 feet.

**Choptank** is a village at Mile 25.6N. The small yacht harbor at Choptank has depths of 2 to 3 feet behind its wooden bulkheads. The old wharf northwest of the yacht harbor is in ruins.

The overhead power cable at Mile 30.7 has a clearance of 139 feet.

**Dover Bridge**, Mile 33.0, has a swing span with a clearance of 10 feet.

**Tuckahoe Creek** is at Mile 39.5N. The channel in the creek has depths of 8 feet for 2.7 miles, thence 5 feet for 6 miles, and thence less than a foot to the fixed highway bridge from Hillaboro to Queen Anne, at the head of navigation 11 miles above the entrance. **Tuckahoe Bridge**, 1.7 miles above the entrance, has a 40-foot fixed span with a clearance of 17 feet. The channel is unmarked, crooked, and difficult to navigate in places without local knowledge. The flats are covered with tuckahoes or marsh grass in the summer. The creek is used only by small fishing and pleasure boats. The overhead power cable just north of the bridge has a clearance of

25 feet. The overhead power cable across the creek about 6 miles above the mouth has a clearance of 32 feet.

**Williston** is a small settlement with a bulkhead landing at Mile 42.0E.

Choptank River is constricted by **Pealiquor Shoal** at Mile 44.3. A dredged channel through the shoal area has a controlling depth of about 6 feet.

**Denton** is a town at Mile 46.6E. The highway bridge over the river here has a bascule span with a clearance of 4 feet. The overhead power cable at the bridge has a clearance of 62 feet. The railroad bridge 0.4 mile above the highway bridge has a swing span with a clearance of 6 feet that remains in the closed position; see 203.245, chapter 2. The overhead power cable 300 yards north of the bridge has a clearance of 131 feet.

Gasoline and some supplies can be obtained at Denton. A boat club is just below the highway bridge.

**Greensboro** is a town at the head of navigation at Mile 53.4W. The controlling depth in the dredged channel above Denton is about 6 feet to within a mile of the bridge at Greensboro, thence 2½ feet to the bridge. The fixed highway bridge at Greensboro has a width of 37 feet and a clearance of 10 feet. Gasoline and some supplies can be obtained in town.

**Chart 550.**—**Eastern Bay**, the approach to Claiborne, St. Michaels, Miles River and other tributaries, is entered between the southerly tip of Kent Island and the northerly end of Poplar Island, 2.2 miles southward.

The shores are low and have few prominent marks. Light-draft vessels also can enter from southward through Poplar Island Narrows and from Chester River on the north by way of Kent Island Narrows.

**Bloody Point Bar Light** (38°50.0' N., 76°23.5' W.), 56 feet above the water, is shown from a brown tower on cylindrical foundation in 7 feet a mile westward of the south end of Kent Island. A fog signal is at the light which is 1 mile due east of a point on the main ship channel 120.2 miles above the Virginia Capes.

The bay is used extensively by oystermen and fishing craft, as well as by increasing numbers of pleasure craft. The channel is wide and deep; within the bay are large shoal areas, but depths of 25 feet can be taken without difficulty to the mouths of most of the tributaries.

**Currents.**—East of Poplar Island the current velocity is 1.0 knot on the flood and 0.6 knot on the ebb. Throughout Eastern Bay the current velocity is less than 1.0 knot.

**Poplar Island**, on the south side of the main entrance, is 1.3 miles long in a north-south direction, and is low and wooded. Smaller **Jefferson Island**, southeast of the northern part of Poplar Island, and **Coaches Island**, east-southeast of the southern end, once were part of the large island. **Poplar Harbor**, formed by the three islands, has secure anchorage in depths of 4 to 6 feet.

**Poplar Island Narrows** has a least width of 1 mile between Coaches Island and the mainland to the eastward.

The marked channel through the narrows has a controlling depth of about 7 feet.

**Ferry Cove**, on the mainland side of Poplar Island Narrows, has depths of 5 to 7 feet in the marked channel leading to **Lowes Wharf** at the head. Gasoline is available at the fish company pier.

**Claiborne** is a summer resort on the southeast side of Eastern Bay 5 miles by deep channel from the main entrance. A combination pier and jetty extends 0.2 mile west-southwestward from the Claiborne waterfront; the pier is in poor condition. The former ferry landing is just south of the old pier. The channel to Claiborne has a controlling depth of about 9 feet with depths of 5 feet in the basin. Gasoline and some supplies can be obtained in the village.

**Kent Point**, the northerly entrance point of Eastern Bay, is the southernmost extremity of **Kent Island**, which has a north-south length of 12.5 miles and a greatest width of 5.5 miles.

**Cox Creek** flows southward from the interior of Kent Island into Eastern Bay between **Long Point**, 2 miles northeast of Kent Point, and **Turkey Point**, 3 miles farther to the northeastward. The channel has depths of 22 feet for 1.5 miles, thence 11 feet for 2 miles, thence 7 feet for 2 more miles, and then shoals gradually to 2 feet at the head of navigation, a fixed highway bridge 6.5 miles above the mouth.

A landing at **Romancoke**, 1.5 miles northward of Long Point, has depths of about 4 feet off its end, but is in poor condition. Above Romancoke, Cox Creek has no villages on its shores and is used mostly by oyster boats. The channel is very narrow in places and shallow water is close to the edges. The shoals are unmarked and local knowledge is needed to avoid them.

**Crab Alley Bay** joins Eastern Bay between **Bodkin Island**, 0.8 mile east-southeastward of Turkey Point, and **Parson Island**, 2 miles eastward of Turkey Point. Bodkin Island is very small and thickly wooded. Larger Parson Island is sparsely wooded and has a ragged appearance.

Crab Alley Bay is 8 miles by deep channel from the Eastern Bay main entrance. The principal channel in Crab Alley Bay is marked and has depths of 8 feet for 2.5 miles to Crab Alley Creek, in the northwestern part of the bay.

The mouth of **Crab Alley Creek**, between **Cox Neck** on the west and **Johnson Island** on the east, is partly obstructed by very shallow areas that extend out from both sides. The channel within the creek has depths of 6 feet for a mile, then shoals gradually to 1 foot at the head.

**Little Creek**, northeast of Johnson Island, has a marked channel leading about halfway up the creek. Depths of 7 feet can be carried up as far as the last daybeacon. The largest marine railway on the creek can haul out boats up to 45 feet in length.

**Prospect Bay**, in the northeastern part of Eastern Bay, is entered between Parson Island and **Piney Neck Point**, 2 miles to the east-southeastward. The entrance is 9

miles by deep channel from the main Eastern Bay entrance.

Prospect Bay extends northward for 5 miles to the bridge over Kent Island Narrows. The channel has natural depths of 21 feet for 2 miles, thence 11 feet for 1 mile, and thence 7 feet to the beginning of the marked approach to the narrows, which is described later in connection with Chester River.

**Greenwood Creek**, entered on the southeast side of Pine Neck Point east of Prospect Bay entrance, has depths of 5 feet for nearly 3 miles inside, but only about 3 feet can be taken over the bar.

**Miles River** flows into the eastern part of Eastern Bay from southeastward, between **Tilghman Point**, at the northeastern end of **Rich Neck**, and **Bennett Point**, 2.3 miles east-southeastward. The entrance is 8.5 miles by deep channel from the main entrance to the bay.

Miles River channel has depths of 20 feet or more for 6 miles, thence 10 feet to the highway bridge 11 miles above the mouth, and lesser depths to the head 14.5 miles above the mouth. A shallow **middle ground**, about 2 miles above the entrance, bares in one place at low water but is well marked on all sides by buoys; the river channel is marked as far as the bridge. The small trade on the river is chiefly in shellfish and shells.

**Tilghman Creek** is on the west side of the entrance along the southeast side of Tilghman Point and Rich Neck. The outer end of Tilghman Point is heavily wooded. The narrow entrance, marked by a light and a buoy, has depths of 9 feet; depths of 11 to 8 feet are inside the creek for the remainder of its 1-mile length. A vessel must stay in midchannel to carry the best water. Gasoline and slips are available at the upper end. A marine railway can haul out boats up to 50 feet in length for repairs.

**Wye River** flows into the east side of Miles River entrance, just inside **Bennett Point**. The approach can be made either around the middle ground or to the north of it. The northerly approach is shorter by 2 miles, but is limited to depths of 9 feet; the southerly encircling approach has depths of 30 feet or more. Both approaches are marked.

Small local boats are the principal users of Wye River and its several branches. The twisting channels are unmarked and require local knowledge. The channel in the river proper has depths of 30 feet or more for 2 miles, thence 10 feet for 4 miles, thence 6 feet for 1.5 miles and shoaler depths thence to the head 9.5 miles above the mouth. Oyster bars are along the channel edges in the vicinity of **Wye Island**. There are several landings along the river and its branches.

**Wye Narrows**, which branches eastward 4 miles above the mouth of Wye River, follows the north side of Wye Island for 4 miles to its junction with **Wye East River**. The channel through the narrows has a controlling depth of 6 feet. Midway along the narrows is a fixed highway bridge with a width of 40 feet and a clearance of 10 feet.

**Long Haul Creek**, on the west side of Miles River 5 miles above the entrance, has depths of 9 feet or more in most of its 0.6-mile length. The Miles River Yacht Club maintains the finger posts and the range that mark the channel into the small club harbor in the creek; the range, bearing about  $285^\circ$ , is lighted from April 1 to December 1.

**St. Michaels**, a town at the head of a small harbor on the west side of Miles River 6 miles above the entrance, has a marked entrance with depths of more than 10 feet. Depths of 8 to 5 feet are in the harbor. The mean range of tide is 1.2 feet. See appendix for **storm warning display**.

Small-craft supplies, fuel, and slips are available at St. Michaels. Largest haul-out capacities for repairs are: railway, 70 feet; lift, 30 tons. The town has railroad freight service.

**Leeds Creek** is directly across Miles River from St. Michaels. **Fairview Point**, on the north side of the entrance, is thickly wooded; the cupola of a large Moorish-type dwelling 0.4 mile north of the point is prominent; the entrance is marked by a buoy. The creek has depths of 5 feet for 2 miles to the village of **Tunis Mills**, then shoals gradually to 3 feet at the head, 0.5 mile farther up. The fixed highway bridge from Tunis Mills to **Copperville**, on the northwest side of the creek, has a width of 17 feet and a clearance of 7 feet.

**Oak Creek**, on the south side of Miles River 8 miles above the entrance, has depths of 2 feet in the mouth and 3 to 5 feet to the village of **Royal Oak** at the head, 0.6 mile above. There are two bridges at the entrance; the fixed highway bridge has a clearance of 25 feet. The railroad bridge has a 24-foot bascule span with a clearance of 2 feet; see **203.285**, chapter 2, for drawspan regulations. Above the wharves at **Newcomb**, on the west side just above the bridges, the creek is obstructed by grass.

**Hunting Creek**, directly across Miles River from Oak Creek, has depths of 5 feet for 2.5 miles. The peninsula on the west side of lower Hunting Creek has a breakthrough with a depth of 2 feet, 0.8 mile above the entrance.

The highway bridge over Miles River 11 miles above the entrance has a 34-foot bascule span with a clearance of 5 feet; see **203.280**, chapter 2, for drawspan regulations.

The Chesapeake Bay shore of Kent Island is low and wooded. Channels with depths of about 5 feet lead to marinas, 3.8 and 4.8 miles north of Kent Point. Supplies, fuel, and slips are available. The northerly marina has a 20-ton lift and does repair work.

A measured nautical mile on course  $001^\circ 30'$  is off **Brickhouse Bar**, 5 miles north of Kent Point and a mile west of Kent Island; buoys and shore ranges mark the course.

**Matapeake**, 7 miles north of Kent Point, is the site of a former ferry terminal. The jettied entrance channel has a controlling depth of about 7 feet leading to a pier just north of the abandoned slips. The waters inside the jet-

ties are used as a State harbor of refuge. Chesapeake Bay Bridge, 9 miles north of Kent Point, is described in chapter 13.

**Chart 548.—Love Point Light ( $39^\circ 03.4' N.$ ,  $76^\circ 17.0' W.$ )**, 38 feet above the water, is shown from a skeleton tower on piles in depths of 10 feet, 1.4 miles northeast of Love Point; a fog signal is at the light.

The main entrance to **Chester River** is between **Love Point**, the northern end of Kent Island, and **Eastern Neck Island**, 3 miles to the eastward. The approach is northward and eastward of Love Point Light.

Light-draft vessels can also enter from Eastern Bay and Miles River on the southward by way of Kent Island Narrows. Traffic on the river consists chiefly of petroleum products and shellfish.

**Mileages** on Chester River are designated Mile 7S, 11W, etc., which are the nautical miles above the entrance. The letters N, S, E, or W, following the numerals indicate the side of the river by compass point direction where each feature is located.

Chester River has channel depths of 13 feet or more to Chestertown, thence 7 feet to Crumpton, and thence 5 feet to Kirby Landing, Mile 35.2S. The channel is marked to Crumpton; private daybeacons mark the channel between Crumpton and Kirby Landing. Above Chester-town, deepest water is difficult to follow except with local knowledge and extreme caution.

The mean range of tide in Chester River is 1.1 feet at the entrance, 1.3 feet at Queenstown, 1.8 feet at Chester-town, and 2.4 feet at Crumpton. The current velocity is less than 1.0 knot. The river is usually closed to navigation by ice for extended periods during ordinary winters; in mild winters the channel is kept clear most of the time by powerboats. The river water is fresh above Chester-town.

**Love Point** is a summer resort on the point on the west side of the entrance to Chester River. The old railroad pier on the river side of the village is in ruins.

**Eastern Neck Island**, on the east side of the entrance, is about 3 miles long in a northwest-southeast direction. The island is sparsely wooded with extensive grassy flats along the south shore. It is connected with the mainland on the north by a fixed highway bridge over **Eastern Neck Narrows**, which is very shallow and little used.

A 6-foot marked channel leads to a marina at Mile 2.7S. Some supplies, fuel, and slips are available. Haul-out capacities for repairs are: railway, 55 feet; lift, 12 tons.

See appendix for **storm warning display**.

**Kent Island Narrows** entrance is at Mile 4.0S. The controlling depth in the marked channel from Chester River to Eastern Bay is about 6 feet. Note well that the system of marking is continuous from Eastern Bay to Chester River; if entering the narrows from Chester River, odd numbers are on the right and even numbers on the left.

The highway bridge over the narrows has a 48-foot bascule span with a clearance of 18 feet; see 203.290, chapter 2, for drawspan regulations. The nearby overhead power cable has a clearance of 85 feet. The current velocity is 1.0 knot on the flood and 0.9 knots on the ebb at the bridge.

**Wells Cove**, on the east side of the narrows 0.4 mile southeast of the bridge, has general depths of 1 to 5 feet. A marked 6-foot channel leads to a basin in the cove.

Many crab and oyster house piers are along Kent Island Narrows and on the north side of Wells Cove, but small-craft facilities are also available in this area where supplies, fuel, and berths can be obtained. Largest haul-out capacities for repairs are: railway, 55 feet; lift, 20 tons.

**Jackson Creek**, Mile 5S, has depths of 2 to 7 feet at the entrance and is used as an anchorage by oyster boats; the channel is marked. The bottom is covered with grass.

**Queenstown Creek**, Mile 6.1E, has a 6-foot marked channel leading to a turning basin at Queenstown, on the southeast side of Little Queenstown Creek. The entrance channel is bordered by very shallow grassy flats.

**Grays Inn Creek**, Mile 10.7W, has depths of 8 feet for 2.3 miles to a small settlement on the west side, then shoals gradually to 1 foot at the head, 3.4 miles above the mouth. About 1.8 miles above the mouth, a marina on **Skinner's Neck** has a marine railway that can haul out craft up to 50 feet in length for repairs; gasoline is available.

**Langford Creek**, Mile 11.3N., has depths of 12 feet over the bar and deeper water inside to the forks 1.7 miles above the mouth; the channel is buoyed to **Drum Point**. An unmarked shoal extends southwestward from small **Cacaway Island** toward the junction of the two fork channels; above the shoal the unmarked forks are clear in midchannel. **East Fork** has depths of 10 feet for 3 miles, thence 7 feet for 1 mile to within a mile of the head. **West Fork** has depths of 8 feet for about 3 miles, thence 6 feet for 0.7 mile.

**Long Cove**, on the west side of Langford Creek 0.7 mile above the mouth, has depths of 4 feet to the head; the entrance is marked. The largest marine railway in the cove can haul out boats up to 60 feet in length for repairs; some supplies and gasoline are available.

**Davis Creek**, on the west side of Langford Creek 1.5 miles above the mouth, has depths of 9 feet to a marina on the south side near the entrance. Gasoline and some supplies are available; a marine railway can haul out boats up to 45 feet in length for repairs.

The common entrance to **Reed Creek** and **Grove Creek** is at Mile 10.7E. The channel to the fork 0.3 mile above the common mouth has a depth of 6 feet. Reed Creek extends southeastward and has depths of 7 feet for about 0.6 mile above the fork, then shoals gradually to 1 foot a mile farther up. The channel in Grove Creek is only about 60 feet wide 0.3 mile above the fork but has depths

of 3 feet through the narrows and 5 feet for a mile above that.

**Corsica River** is at Mile 11.9E. The controlling depth to the wharf at **Centreville Landing**, 5 miles above the mouth, is about 7 feet. The lower part of the river is marked, but it is difficult to stay in the upper channel without local knowledge. Some supplies and gasoline can be obtained at Centreville, 0.5 mile inland of the landing. The main wharf at the landing is in poor condition, but a smaller wharf is available.

**Southeast Creek**, Mile 19.8S has depths of 4 feet for 1.8 miles, then shoals to 1 foot at the head of navigation 0.4 mile farther up. **Island Creek**, which empties into the south side of Southeast Creek, 0.5 mile above the mouth, has depths of 3½ feet in the entrance and 4 feet or more for 2 miles to a fixed highway bridge. Both creeks are marked by bush stakes in the difficult reaches.

A marina is at **Rolphs**, Mile 20.7E. Some supplies, fuel, and slips are available. Repairs can be made; lift, 8 tons.

See appendix for storm warning display.

**Chestertown**, Mile 23.8W, is a county seat and has bus and rail transportation. Water commerce consists chiefly of barged petroleum products and grains.

The highway bridge over the river at Chestertown has a bascule span with a clearance of 12 feet; see 203.245, chapter 2, for drawspan regulations. The county wharf 0.1 mile below the bridge has depths of 14 feet alongside. The wharf at the marina 0.2 mile below the bridge has depths of 14 feet at the outer end and 6 feet at the inner face. Supplies, gasoline, and slips are available. A marine railway can haul out boats up to 40 feet in length for repairs.

Between Chestertown and Crumpton the channel is very narrow in places, with broad flats on either side which are almost awash at low water. Though marked in the more critical places, it is difficult to navigate without local knowledge and is more easily followed at low water.

**Morgan Creek**, Mile 25.7N, has depths of 4 feet over the bar at the entrance and 5 feet for 2 miles in a narrow crooked channel. The entrance is a narrow slough between flats almost awash at low water and is usually marked by bush stakes. A fixed highway bridge 0.6 mile above the entrance has a clearance of 8 feet.

A public wharf is at **Deep Landing**, Mile 30S. **Crumpton** is at Mile 32S. The highway bridge at the town has a 40-foot fixed span with a clearance of 14 feet.

Above Crumpton, the channel in **Chester River** is difficult to follow without local knowledge.

**Rock Hall Harbor**, north of the entrance to **Chester River** and 5 miles north-northeastward of **Love Point Light**, is a base for a large fishing fleet. Traffic in the harbor consists chiefly of fish, shellfish, and shells. The controlling depth in the entrance channel is about 8 feet.

The approach to **Rock Hall Harbor** is from southward, between **Swan Point Bar** and the mainland on a lighted

range. The entrance channel and the channels inside the jetties are marked.

Depths at the packing house and fish wharves in Rock Hall Harbor range up to 9 feet. Some supplies and fuel can be obtained on the waterfront. The largest haul-out capacities for repairs are: railway, 65 feet; lift, 20 tons.

**Swan Creek** is a mile northwestward of Rock Hall Harbor and 0.7 mile southeastward of **Swan Point**, which is 139 miles above the Virginia Capes. The Creek channel has depths of 7 feet for 1 mile above **Little Neck Island**, on the west side of the entrance, then shoals to 1 foot

at the head of navigation 2.3 miles above the entrance.

The shallow flats that extend 0.4 mile south-southeastward from Little Neck Island are marked by a buoy. The approach to Swan Creek is made on the same north-by-west lighted range used for Rock Hall Harbor.

Supplies, fuel, and slips are available at **Gratitude**, 0.5 mile above the entrance to Swan Creek. Repairs can be made; largest lift, 12 tons. The area in Swan Creek just north of **Deep Landing** and **The Haven**, a cove a half mile east of Deep Landing, provides a good small-boat refuge in heavy weather.

See appendix for **storm warning display**.

## 15. BALTIMORE TO HEAD OF CHESAPEAKE BAY

**Chart 1226.**—The most important of the many tributaries that empty into the northern end of Chesapeake Bay are Patapsco, Elk, and Susquehanna Rivers. Patapsco River forms Baltimore Harbor, and Elk River is the approach to the Chesapeake and Delaware Canal; the other tributaries are seldom used by vessels drawing more than 12 feet. The shores are mostly wooded in the undeveloped areas and rise to considerable heights in the vicinity of Northeast and Susquehanna Rivers.

There are extensive shoal areas in the upper part of the bay, and fishtraps are numerous in season; fishtrap limits are shown on the chart. All of the tributaries are usually closed by ice for extended periods during the winter.

**Chart 549.**—Sandy Point Light and Baltimore Light, respectively 131.5 and 134.2 miles above the Virginia Capes, were described in chapter 13. The channel to Baltimore and the channel to the head of Chesapeake Bay divide at 0.5 mile eastward of Sandy Point Light.

**Sevenfoot Knoll Light** ( $39^{\circ}09.3' \text{ N.}, 76^{\circ}24.5' \text{ W.}$ ), 42 feet above the water, is shown from a red cylindrical pile structure on the northeast side of the channel to Baltimore, 140.1 miles from the Capes; a fog signal is sounded at the light.

**Baltimore Harbor** consists of the entire Patapsco River and its tributaries; a part of the waterfront thus included lies outside the municipal limits of Baltimore but by State law is within the jurisdiction of the Maryland Port Authority.

**Patapsco River** joins the west side of Chesapeake Bay between Bodkin Point and North Point 4 miles to the northward; the midchannel point in the entrance, 2 miles northwest of Sevenfoot Knoll Light, is 142.1 miles above the Virginia Capes, and 54 miles from Delaware River by way of the Chesapeake and Delaware Canal.

**Channels.**—Federal project depths are: 42 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore; 35 feet in the main channel between the Delaware Capes and Baltimore via the Chesapeake and Delaware Canal; 42 feet in Curtis Bay Channel; 42 feet in Ferry Bar Channel (east section) to the channel leading to the Port Covington yard; and 35 feet in East Channel and West Channel of Northwest Harbor.

The channels are maintained at or near project depths, except the Delaware Capes-Baltimore route (1965 controlling depth, 25 feet) which was being dredged to 35 feet in 1965. Controlling depths are published in the Notice to Mariners.

**Bodkin Point** is the low northeastern extremity of Bodkin Neck, on the south side of the entrance to

Patapsco River. Shoals extend northward and eastward from the point to the edge of the main channel.

**Bodkin Creek**, which flows into Patapsco River along the inner side of Bodkin Neck, has depths of 9 feet in the approaches and 7 to 9 feet for considerable distances into its branches. The channel is very narrow at the mouth and leads between extensive shoals. The approaches and the narrow entrance are marked.

**Back Creek** is on the northwest side of Bodkin Creek just inside the mouth. A boatyard in the upper part has some supplies, gasoline, and slips. The marine railway can haul out boats up to 40 feet in length for repairs.

**Main Creek** is separated from Back Creek by Spit Neck. Both branches have depths of 7 to 9 feet almost to their heads and are much used by pleasure craft.

Some supplies, gasoline, and slips can be obtained at **Graveyard Point**, on the south side of Main Creek 0.2 mile above the mouth. Largest haul-out capacities for repairs are: railway, 55 feet; lift, 6 tons.

A marina at the entrance to **Perry Cove**, 1.3 miles above the mouth of Main Creek, has some supplies, gasoline, and slips. A marine railway can haul out boats up to 65 feet in length for repairs.

**Rock Point** is on the southwest side of Patapsco River 3 miles above Bodkin Point. Back of Rock Point is an elevated water tank, and a pier extends out from the Rock Creek side to depths of 5 feet or more. **White Rocks**, 0.6 mile northwest of Rock Point, are about 15 feet high and marked by a light; the deepest water is north and west of the rocks.

**Rock Creek**, on the northwest side of Rock Point, has depths of 11 feet almost to the head. It is marked; a light on the east side marks the narrow part of the channel off Fairview, 0.5 mile above the mouth.

**Wall Cove** empties into the southeast side of Rock Creek along the south side of Fairview. The Maryland Yacht Club piers on the Fairview side of the entrance have depths of about 13 feet at their outer ends.

There are several marinas and boatyards in Wall Cove and along Rock Creek where supplies, fuel, and slips can be obtained. Largest haul-out capacities for repairs are: railway, 110 feet; lift, 16 tons.

**Stony Creek**, on the southwest side of Patapsco River 5 miles above Bodkin Point, has depths of 12 feet or more almost to the head. The channel along the west side of the entrance is about 70 yards wide and marked by a light and buoys; the east side is obstructed by rocks, some of which bare at all stages of the tide. The highway bridge 0.8 mile above the mouth of Stony Creek has a 40-foot bascule span with a clearance of 18 feet. A marina

on the north side just above the bridge has fuel, supplies, and berths.

**Nabbs Creek**, a tributary on the northwest side of Stony Creek, a mile above the mouth, has depths of 12 feet almost to the head; some supplies, fuel, and slips are available on the north side of the entrance. The largest marine railway near the head of the creek can haul out boats up to 60 feet in length for repairs.

**Back Cove**, on the north side of Nabbs Creek near the mouth, has depths of 12 feet to a boatyard 0.3 mile above the entrance. The marine railway can haul out boats up to 75 feet in length for repairs; gasoline is available.

**Old Road Bay**, which empties into Patapsco River along the west side of North Point, has general depths of 7 to 12 feet. A rock covered 1 foot, 1.1 miles northwest of North Point, is marked by a buoy; another buoy marks the edge of the shoal that extends westward from North Point; a light 0.25 mile off the north shore of the bay, marks a shoal that extends 0.5 mile from the west shore.

**North Point Creek and Jones Creek**, which empty into the northeast and northwest corners of Old Road Bay, have depths of 4 to 6 feet; the approach to both creeks is eastward of the light off the north shore of the bay. Small-craft facilities are in both creeks. Supplies, fuel, and slips are available. Largest haul-out capacities for repairs are: railway, 60 feet; lift, 10 tons.

**Chart 545.—Baltimore, Md.**, one of the major ports of the United States, is at the head of tidewater navigation on Patapsco River. The midharbor point, at the intersection of Fort McHenry and Ferry Bar Channels 0.6 mile southeast of Fort McHenry, is 8 miles from the mouth of the river, 150 miles above the Virginia Capes, and 62 miles from Delaware River.

Principal imports are crude petroleum and petroleum products, iron ore, chrome and manganese, gypsum, lumber, motor vehicles, fertilizers, sugar, and bananas; exports are chiefly grains, metal products, coal, and chemicals. Coastwise receipts are crude petroleum and petroleum products, fertilizers, sulfur, sugar, and lumber; shipments are mostly petroleum and metal products.

**Channels.**—Federal project channels were discussed at the beginning of the chapter. The branch channels will be covered in the descriptions of the tributaries.

**Anchorage.**—Anchorage areas have been prescribed for Baltimore Harbor by the Maryland Port Authority, which has issued the following regulations. Limits of the anchorages are shown on chart 545.

All vessels anchoring in the harbor shall anchor so as to keep within one of said anchorages and be subject to all rules and regulations which the Maryland Port Authority may prescribe. All vessels, when at anchor between sunset and sunrise, shall comply with Federal regulations governing anchor lights.

The master or other person in charge of any vessel so anchored as to obstruct the free passage of any other

vessel to or from an anchorage, wharf, or dock, or moored or anchored so that they will be or will swing beyond the boundaries of said anchorage, shall, upon being notified, immediately correct the condition, and if the condition continues beyond six hours from the time of the notification, a penalty of \$25.00 for each and every hour beyond this time limit, or thirty days in the city jail, or both, shall, upon conviction, be imposed upon the person responsible therefor. If no person be on such vessel, upon whom said notice can be served, then the Maryland Port Authority shall have such vessel removed and the expense for same shall be paid to the Maryland Port Authority by the master, owner, or agent of such vessel. The Maryland Port Authority shall have the authority to designate such other emergency anchorage locations in Baltimore Harbor as the needs may require and to maintain and patrol said locations until the emergency has ceased.

**Anchorage A** is in Canton Hollow in the Northwest Branch, Patapsco River. No vessel shall anchor within 300 feet of any pier or bulkhead fronting on this anchorage.

**Anchorage C** is south of Ferry Bar. This anchorage shall be restricted to yachts.

**Anchorage No. 1 (Fort McHenry).** This anchorage is to be used only as an overnight anchorage for vessels waiting to go to piers. No vessel may remain on this anchorage more than 12 hours without a permit from the Maryland Port Authority.

**Anchorage No. 2 (General Anchorage)** is between Lazaretto Point and the Dundalk Marine Terminal. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to be a general anchorage for vessels with a draft of 24 feet and under.

**Anchorage No. 3 (General Anchorage)** is between Fort McHenry Channel and the Dundalk Marine Terminal. This anchorage shall be restricted to vessels of over 24 feet draft. No vessel shall remain on this anchorage longer than four days without obtaining a permit from the Maryland Port Authority.

**Anchorage No. 4 (General Anchorage)** is between Solers Point and the Dundalk Marine Terminal. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to be a general anchorage for vessels drawing 20 feet and under.

**Anchorage No. 5 (General Anchorage)** is between Fort McHenry Channel and Curtis Bay Channel. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to be a general anchorage for vessels drawing 20 feet and under.

**Anchorage No. 6 (Explosives Anchorage)** is northeast of Fort McHenry Channel and just northwest of Fort Carroll. Vessels are to anchor here only for the loading and unloading of explosives; vessels loading explosives are to leave the port immediately upon the completion of

the transfer. Permits are required for use of the anchorage.

**Anchorage No. 7 (Quarantine Anchorage)** is in the area west of Fort McHenry Channel and south of Curtis Bay Channel. This anchorage is to be used only by vessels waiting quarantine inspection. Special permits for use of the lower part of the anchorage for explosive loading of vessels may be issued in extraordinary cases.

**Anchorage No. 8 (Dead Anchorage)** is in Curtis Bay, south of Curtis Bay Channel. Vessels shall anchor so as not to swing within 100 yards of the channel. No vessel may occupy this anchorage without obtaining a permit from the Maryland Port Authority. When the Maryland Port Authority finds such action necessary to conserve space, he may require vessels in this anchorage to moor bow and stern to one anchor.

**Anchorage No. 9 (General Anchorage)** is north of Ferry Bar Channel and southwest of Fort McHenry Park. This anchorage is to be used only by vessels using nearby docks while awaiting berths at piers. No vessel may remain in this anchorage more than 12 hours without obtaining a permit from the Maryland Port Authority.

**Tides and currents.**—The mean range of tide is 1.1 feet at Baltimore; daily predictions are given in the Tide Tables. Prolonged winds of constant direction may cause substantial variation in the tide. Currents in the harbor are too weak and variable to be predicted.

See appendix for Baltimore climatological table and storm warning display.

**Fogs** occur chiefly from October to March, inclusive. From April to September there are only a few days with dense fogs. Very light winds clear the fog away.

**Ice.**—Baltimore Harbor is frozen over during severe winters, but the ice-breakers and the larger power-driven vessels keep the dredged channels open so that self-propelled vessels seldom have difficulty in entering the harbor. Ice conditions in the main channel are most severe in the vicinity of Sevenfoot Knoll Light, where ice moving from the northern end of Chesapeake Bay tends to collect in packs. Navigation from Baltimore to the upper end of the bay and the Chesapeake and Delaware Canal is likely to be interrupted by ice for short periods during an average winter.

**Pilotage** is compulsory for foreign vessels and American vessels in the foreign trade bound to or from the port of Baltimore.

The Association of Maryland Pilots provides pilotage between Baltimore and the Virginia Capes, and between Baltimore and the Maryland entrance to the Chesapeake and Delaware Canal at Chesapeake City, Md. Pilots of the association also serve Maryland ports in the tributaries of Chesapeake Bay and the District of Columbia. The dispatch office is on Recreation Pier at the foot of Broadway, 0.7 mile above Fort McHenry.

Pilotage information for incoming vessels is given in chapters 6, 7, and 9.

**Towage.**—A large fleet of tugs is available at all times to assist vessels arriving or departing, in docking or undocking, and in shifting within the harbor. Long distance towage is also available.

**Quarantine.**—Vessels subject to quarantine may proceed to pier berths between 6 a.m. and 6 p.m. for inspection. At other times, vessels remain at anchor unless previous arrangements have been made for boarding. A 24-hour advance notice of time of arrival should be given to the quarantine officer by agent or master.

A Public Health Service hospital is in Baltimore.

**Customs.**—Baltimore is a port of entry and marine documents are issued. Vessels subject to inspection are boarded by Customs officers after they have been cleared by Quarantine officers at dockside. Special arrangements can be made for boarding at anchor.

**Immigration.**—Inbound vessels are boarded with the quarantine boarding officer.

**Harbor regulations.**—The Maryland Port Authority has general jurisdiction over the physical operation of Baltimore Harbor and issues rules and regulations pertaining to the use of public wharves and anchorage areas.

**Wharves.**—Baltimore has almost 150 piers, wharves, and docks which have direct connections with the railroads and trucking lines. General cargo piers are located throughout the harbor. Ore is handled at Sparrows Point. Ore, coal, and other bulk cargoes are handled in Curtis Bay, Port Covington, Lower Canton, and in Northwest Harbor. Grain elevators are at Port Covington, Lower Canton, and Locust Point; petroleum terminals are in Curtis Bay, at Fairfield, and in Northwest Harbor. Depths at most of the principal facilities are 20 to 35 feet, but some of the bulk loading terminals have as much as 42 feet alongside.

Cranes and derricks with lift capacities to 50 tons are available. A 126-ton floating crane can be rented. Numerous warehouses and cold-storage facilities are available.

Several municipal piers administered by the harbor-master are located throughout the harbor district. They are used principally by vessels in the coastwise trade.

**Supplies.**—Vessels may bunker directly at marine oil terminals or may be serviced by barge at anchor or at loading berths. Water may be obtained from pipelines at most of the piers. Water can also be delivered by waterboat anywhere in the harbor.

**Repairs.**—Baltimore is well equipped for major repairs to large vessels. The largest floating drydock, in Northwest Harbor, can lift 22,000 tons and handle vessels up to 690 feet long, 110 feet wide, and 25 feet in draft; a graving dock at the same plant has only slightly less capacity. Marine railways can haul out vessels up to 250 feet in length and 1,600 tons in weight. Several smaller railways along the tributaries cater to the yachtsman and small-boat operator.

Baltimore has extensive facilities for wrecking and salvage. In addition to equipment especially designed for

salvage operations, there are heavy hoisting facilities which, though primarily designed for private industrial purposes, are available in case of need.

**Communications.**—Nearly all the piers, wharves, and docks in Baltimore Harbor are close to the center of the city and all are connected to it by wide paved streets. Many of the piers have direct connections with the main-line railroads whose tracks are connected with all parts of the port area.

The Maryland Port Authority radio station reports local harbor information to shipping.

Baltimore is served by the Pennsylvania Railroad, the Baltimore and Ohio Railroad, and the Western Maryland Railway. The Canton Railroad is a terminal line that operates about 35 miles of track in the port area and connects with the major roads.

More than 100 steamship services connect Baltimore with principal United States and foreign ports by regular sailings in the overseas, coastwise, and intercoastal trades. About 150 motor truck carriers serve the port.

**Friendship International Airport** is inland, about 7 miles southwestward of Fort McHenry.

**Sparrows Point**, on the northeast side of Patapsco River 3 miles above the mouth, is the site of the Bethlehem Steel Corporation steel and shipbuilding plants. The two marked channels on the south side of Sparrows Point lead from the main channel in Baltimore Harbor to the ore-handling wharves; the easterly channel has a controlling depth of about 33 feet and the middle channel, 40 feet. The marked channel on the west side of the point has a controlling depth of about 22 feet and leads to the shipyard facilities; a buoyed branch coal pier channel has a controlling depth of about 18 feet.

**Bear Creek**, on the northeast side of Patapsco River 4 miles above the mouth, has channel depths of 8 feet or more almost to the head, 3.5 miles above the mouth. An overhead power cable a mile above the mouth has a clearance of 95 feet between lighted structures.

**Peachorchard Cove**, on the west side of Bear Creek just below the first bridge, has depths of 9 feet for 0.4 mile to within 0.1 mile of its head.

The highway bridge over Bear Creek 1.3 miles above the mouth has a bascule span with a clearance of 15 feet. The highway bridge 0.5 mile upstream has a bascule span with a clearance of 25 feet. Drawspan regulations for these bridges are given in 203.245, chapter 2. The railroad bridge 0.7 mile above the first bridge has a swing span with a clearance of 8 feet.

**Lynch Cove**, on the northwest side of Bear Creek 0.8 mile above the first bridge, has depths of 12 feet for 0.5 mile, thence 9 feet for another 0.3 mile, and thence 7 feet to just south of the burned wreck of a large barge. A 4-foot shoal in midentrance is marked by a daybeacon.

There are small-craft facilities in Lynch Cove where supplies, fuel, and slips can be obtained. The largest haul-out capacities for repairs are: railway, 100 feet; lift, 12 tons.

**Schoolhouse Cove**, 1.5 miles above the first bridge, has depths of 8 to 12 feet to near the head. A small boatyard in the cove can haul out boats up to 42 feet in length. A yacht club is on the east side of Bear Creek just below Schoolhouse Cove.

The highway bridge over Bear Creek just above Schoolhouse Cove, has a bascule span with a clearance of 12 feet.

**Fort Carroll** is a stone-and-concrete structure on the northeast side of Patapsco River main channel 4.4 miles above the mouth. The white tower of the abandoned lighthouse is on the west front of the fort.

**Hawkins Point**, on the southwest side of Patapsco River 4.5 miles above the mouth, is at the southeastern limits of Baltimore. There are many obstructions surrounding the point. A buoyed 36-foot channel leads to a 720-foot long cargo pier with rail and truck connections 0.4 mile northwestward of the point. Caution should be exercised in approaching the pier because the outer portion is in ruins and underwater obstructions may be in the area.

**Curtis Bay**, on the southwest side of Patapsco River 6 miles above the mouth, is the approach to large coal and oil wharves and to several industrial plants. The entrance is between Leading Point and Fishing Point, 0.8 miles to the northwestward. Depths in well-marked Curtis Bay Channel were given at the beginning of the chapter.

A 27-foot channel leads to a 400-foot gypsum pier with mooring dolphins and conveyor belt 0.2 mile west of Leading Point; the berth has depths of 25 feet.

**Petroleum terminals on Fishing Point** have depths of about 30 feet alongside. Vessels can be bunkered at the rate of 1,000 barrels per hour.

A 40-foot channel leads to an ore pier on the southwest side of **Stonehouse Cove**. Depths alongside the pier are about 35 feet; vessels can be unloaded at the rate of 2,000 tons per hour.

The coal pier at the head of Curtis Bay Channel has depths of about 30 feet on the north side and 40 feet on the south side. Vessels can be loaded at the rate of 4,800 tons per hour.

**Curtis Creek** empties into the head of Curtis Bay from southward between **Sledds Point** and **Ferry Point**, 0.3 mile to the southwestward. Channel controlling depths are about 35 feet to a point 750 feet north of Pennington Avenue bridge, thence 19 feet for 0.9 mile above this bridge to the wharves on the west side and to the Coast Guard yard in Arundel Cove. The channel is buoyed at the critical points.

**Cabin Branch**, on the west side of Curtis Creek just south of Ferry Point, has depths of 18 feet or more to within 0.1 mile of a fixed bridge 0.4 mile above the entrance. The industrial wharves on the north side of the branch have depths of 14 to 30 feet at their faces.

Several of the wharves on either side of Curtis Creek between the entrance and Pennington Avenue bridge have depths of 25 to 30 feet at their faces.

The Pennington Avenue bridge, 0.9 mile above the entrance to Curtis Creek, has a bascule span with a clearance of 17 feet. A shipyard on the west side of Curtis Creek just north of the bridge has a marine railway that can haul out vessels up to 125 feet in length for repairs.

The railroad bridge 1.3 miles above the entrance has a swing span with a clearance of 13 feet.

**Arundel Cove** is on the east side of Curtis Creek 1.6 miles above the entrance. The Coast Guard yard is on the north side of the cove. A highway bridge 0.4 mile above the entrance to the cove has a 28-foot fixed span with a clearance of 6 feet.

A depth of 16 feet can be carried up Curtis Creek beyond the improved sections to the forks 2.3 miles above the entrance. **Marley Creek** (chart 549), the middle fork, has depths of 12 feet or more for 1.2 miles, then shoals gradually to 3 feet at a fixed bridge a mile farther up; the bridge has a clearance of 4 feet. An overhead cable about 0.6 mile above the entrance has a clearance of 57 feet.

A marine service pier on the west side of Marley Creek 1.3 miles above the forks has depths of 12 feet at the face and is marked by a light; gasoline and water are available. A marine railway directly opposite the service station can handle boats up to 75 feet in length for hull and engine repairs.

The **Fairfield** section of Baltimore begins 6.5 miles above the mouth of Patapsco River and extends upriver along the southwest side for more than a mile. Most of the piers and wharves handle paper, petroleum products, sulfur, chemicals, fertilizers, scrap metal, and lumber; depths range from 18 to 30 feet at most of the facilities, but depths of 25 to 34 feet are at the petroleum terminals at the southerly end of the section. Vessels can be bunkered at the rate of 1,800 barrels per hour. The largest floating drydock at the Maryland Shipbuilding and Drydock Company, at the upper end of the section, has a lifting capacity of 20,680 tons; 50-ton pier cranes and 35-ton floating cranes are available.

**Dundalk Marine Terminal**, on the east side of Patapsco River 6.5 miles above the mouth, has a 34-foot marked entrance channel. The general cargo terminal with rail and truck connections has a 3,200-foot marginal wharf on the west side and a 1,500-foot marginal wharf on the south side; depths alongside are 32 to 35 feet; 50-ton gantry cranes are available.

**Colgate Creek**, just north of the Dundalk facility, has channel depths of 10 feet or more to the second bridge, 0.8 mile above the entrance. A depth of about 30 feet can be carried to the bulkhead wharf of an electric company on the west side of the entrance by using the Dundalk channel. Depths of 23 to 30 feet are alongside the 700-foot wharf.

The highway bridge 0.3 mile above the entrance has a swing span with a width of 40 feet and a clearance of 4 feet; see 203.245, chapter 2, for drawspan regulations.

The railroad bridge 0.8 mile above the entrance has a swing span with a width of 30 feet and a clearance of 5 feet; the drawspan is fixed in the closed position.

The **Lower Canton** section of Baltimore begins on the north side of Patapsco River 7.5 miles above the mouth and extends westward to **Lazaretto Point**. Dredged and buoyed channels lead to the principal piers which handle general cargo, grain, ore, and chemicals; depths of 20 to 39 feet are at the berths. The grain elevator at the eastern end of the section has a storage capacity of 4,225,000 bushels; ships can load at the rate of 225,000 bushels per hour. Vessels can be unloaded at the rate of 800 tons per hour at the adjacent ore pier. The ore pier at the western end of the section can unload 3,000 tons per hour.

Patapsco River turns sharply westward at the intersection of Ferry Bar Channel and main Fort McHenry Channel 7.8 miles above the mouth. About 0.7 mile wide between **Fort McHenry** on the north and **Fairfield** on the south, the river narrows to a width of 150 yards 10 miles above the mouth and meanders off to the southwestward while the deeper channel continues westward into **Middle Branch**.

**Ferry Bar** is a point on the north side of Ferry Bar Channel 1.5 miles westward of Fort McHenry.

Depths in well marked Ferry Bar Channel (east section) were given at the beginning of the chapter. The controlling depths in the marked channel continuing westward are about 18 feet to the railroad bridge in Middle Branch, thence 15 feet to within 0.2 mile of the head, 1.4 miles above Ferry Bar.

A buoyed channel with docking range lights leads to the Baltimore and Ohio Railroad banana pier a mile westward along Ferry Bar Channel. Depths of 28 to 30 feet are in the entrance channel and basin and 30 feet alongside the 700-foot pier.

The **Western Maryland Railway Port Covington** section of Baltimore begins 0.8 mile west of Fort McHenry and extends west and southwestward to Ferry Bar. The buoyed approach is 1.2 miles westward along Ferry Bar Channel. Depths of 30 to 40 feet are in the approach channels and 33 to 40 feet alongside the principal piers. The general cargo piers cover most of the easterly half of the section. Bulk pier 6 can unload 2,000 tons of ore per hour. Coal pier 4 can load 3,500 tons per hour. The grain elevator on pier 2 has a capacity of nearly 5,000,000 bushels and can load 150,000 bushels per hour.

Depths of about 10 feet are at the outer ends of piers at boatyards 0.4 mile northwestward of Ferry Bar. The largest marine railway can haul out boats up to 50 feet in length for repairs. Gasoline and some supplies are available.

The **Hanover Street** bridge over Middle Branch 0.3 mile above Ferry Bar has a bascule span with a clearance of 25 feet; see 203.305, chapter 2, for drawspan regulations. The **Western Maryland Railway** bridge, a mile above Ferry Bar, has a swing span with a clearance of 9 feet.

Most of the marine facilities in Middle Branch are used by small vessels and barges for delivery of petroleum and coal for local consumption.

**Northwest Harbor**, the northerly branch of Patapsco River, is entered between Fort McHenry and Lazaretto Point, 8.2 miles above the mouth of Patapsco River. The harbor has depths of about 35 feet to the principal piers on either side of the lower reaches and to the line from **Locust Point** on the southwest to **Fells Point** on the northeast, 1.2 miles above the entrance; thence about 25 feet for 0.6 mile; and thence about 21 feet to the head, 2.5 miles from the entrance.

The **Baltimore and Ohio Railroad Locust Point** section is on the southwest side between Fort McHenry and Locust Point. Most of the piers handle general cargo, but some also handle bulk; depths alongside are 30 to 35 feet. The grain elevator at pier 7 has a capacity of nearly 4,000,000 bushels and can load 150,000 bushels per hour.

The piers and wharves on the east and north sides of Northwest Harbor handle general cargo, coal, petroleum products, chemicals, and fertilizers; depths alongside the principal facilities are 30 to 35 feet, and at the others, 15 to 25 feet. The coal pier 0.2 mile north of Lazaretto Point can load 800 tons per hour. Vessels can be bunkered at the rate of 6,000 barrels per hour at the petroleum terminal 0.7 mile north of Lazaretto Point.

The ship repair facilities in Northwest Harbor can handle large ocean-going vessels. The graving dock on the southwest side of the harbor 0.4 mile above Fort McHenry is 460 feet long, 58 feet wide at the bottom, with a water depth of 18 feet. The largest marine railway, 0.4 mile west of Locust Point, is 250 feet long and can lift 1,600 tons. The largest of the floating drydocks, 0.7 mile westward of Locust Point, is 690 feet long, 110 feet wide, has a water depth of 25 feet, and can lift 22,000 tons. The graving dock at this plant is 589 feet long, 78 feet wide at bottom, and has a water depth of 23 feet.

A marina with depths of 12 feet or more at the slips is on the south side of the inner harbor at the head of the basin. Fuel and some small-craft supplies are available.

**Chart 549.—Swan Point**, on the east side of Chesapeake Bay opposite Patapsco River entrance, has been mentioned in chapter 14.

**Fairlee Creek**, on the east side of Chesapeake Bay 8.5 miles north-northeastward of Swan Point, has a narrow entrance between a jetty on the east and a long, low hook on the west. The privately buoyed entrance has depths of about 6 feet. A yacht club with berthing facilities is on the east side of the creek just inside the entrance; fuel and some supplies are available.

See appendix for storm warning display.

**Worton Point** is on the east side of Chesapeake Bay 152.5 miles above the Virginia Capes. A flashing white light is shown from a watch tower on the point during the ice season; a flashing red light is shown from this structure at night when firing is in progress; see 204.30, chapter 2, for regulations of the restricted area.

About 1.5 miles southward of Worton Point is **Worton Creek**, which has depths of 10 to 12 feet in the broad bight at the entrance and 7 feet inside for 1.4 miles. Good anchorage, protected from easterly winds, is available in depths of 11 to 12 feet just inside the entrance. The critical part of the channel, 0.5 mile above the entrance, is marked by buoys.

The marina at **Buck Neck Landing**, on the east side of Worton Creek 1.4 miles above the entrance, has fuel and berthing facilities; some supplies are available. Haul-out capacities for repairs are: railway, 60 feet; lift, 12 tons. The public bulkhead adjoining the fuel pier has depths of about 6 feet alongside.

**Pooles Island**, 10 miles northeastward of Baltimore Harbor entrance, has an abandoned lighthouse on the west side near the north end. On the island are the white skeleton towers of two lighted ranges, the rear tower common to both. The north range marks a reach of the main channel leading to the Chesapeake and Delaware Canal. The south range marks a passage across the middle ground east of the island. Pooles Island is entirely within the Aberdeen Proving Ground; see 204.30, chapter 2, for limits and regulations of the restricted area.

**Local magnetic disturbance.**—Differences of as much as 5° from the normal variation have been observed in the channel from Pooles Island to Howell Point.

**Pooles Island Bar Light** (39°15.7' N., 76°16.7' W.), 27 feet above the water, is shown from a black skeleton tower on a cylinder base, in depths of 18 feet 0.8 mile south-southwestward of the island; a fog signal is sounded at the light, which is 147.1 miles above the Virginia Capes.

A buoyed lane extends southwestward between fishtrap areas from eastward of Pooles Island to the Baltimore channel a mile southward of North Point. The lane, with a minimum depth of 10 feet, is entered on the Pooles Island south range, bearing 264°; Pooles Island Bar Light is on the northwest side of the lane.

The approach to the rivers between North Point and Pooles Island is through a buoyed side lane southwestward of Pooles Island Bar Light.

**Hawk Cove**, 5 miles north-northeastward of North Point, has depths of 8 to 11 feet and is a good anchorage.

**Back River**, which flows into the southwest end of Hawk Cove, has depths of 7 to 4 feet for 6 miles to a fixed highway bridge with a width of 44 feet and a clearance of 14 feet; even the smallest boats seldom go above the bridge. The channel is unmarked, but is clear except for a 4-foot middle ground about halfway between Hawk Cove and the bridge.

There are small-craft facilities on both sides of Back River where gasoline, supplies, and slips can be obtained. The largest haul-out capacities for repairs are: railway, 50 feet; lift, 20 tons.

**Charts 549, 1226.—Middle River**, 6.5 miles north-northeastward of North Point, has a controlling depth of

about 9 feet in a marked channel leading to an anchorage basin at the Martin Company plant at the head of **Dark Head Creek**, the east fork of the river 3.2 miles above the mouth. The west fork of Middle River has depths of 7 feet to within 0.5 mile of a fixed bridge near the head.

**Sue Creek**, on the south side of the entrance to Middle River, has depths of about 7 feet to the yacht club just inside the entrance, thence depths of 5 to 3 feet for a mile inside. The entrance is marked by a light.

**Galloway Creek**, a broad cove on the north side of Middle River just inside the entrance, has depths of 8 to 5 feet except along the shoreline.

**Frog Mortar Creek**, on the northeast side of Middle River 1.5 miles above the mouth, has depths of 6 to 8 feet. A 12-foot channel leads from Middle River to the Martin Company seaplane basin on the west side of the creek 0.5 mile above the entrance.

**Hopkins Creek**, on the southwest side of Middle River 2.6 miles above the mouth, has depths of 8 to 5 feet.

Numerous small-craft facilities are at the upper end of Middle River and in most of the tributaries. Most places have supplies, gasoline, and slips. The largest haul-out capacities for repairs are: railway, 60 feet; lift, 35 tons.

See appendix for storm warning displays.

**Seneca Creek**, 8 miles north-northeastward of North Point, has depths of 8 feet in the entrance and 5 to 6 feet into the several arms. A light marks the outer end of the shoal on the east side of the entrance. Supplies, gasoline, and slips can be obtained in the westerly arm, a mile above the entrance. Largest haul-out capacities for repairs are: railway, 40 feet; lift, 12 tons.

**Gunpowder River**, 9 miles northeastward of North Point, is entered through a buoyed channel westward of marshy **Spry Island**, in midentrance; the island covers at high water and must be avoided. The river has channel depths of 11 feet for 2 miles, thence 6 to 8 feet for 3.5 miles, and thence 4 feet to a fixed railroad bridge with a 35-foot channel span and clearance of 12 feet, 6.3 miles above the mouth. Marinas above the bridge have fuel and do repair work.

**Spry Island** and most of **Gunpowder River** are within the **Aberdeen Proving Ground**; see 204.30, chapter 2, for limits and regulations of the restricted area. Flashing red lights are shown on **Robins Point**, at the south end of **Gunpowder Neck**, and **Maxwell Point**, on the east side of **Gunpowder River** 3.5 miles above the mouth, at night when firing is in progress.

**Chart 572.**—**Bush River** is on the northwest side of **Chesapeake Bay** 152 miles above the **Virginia Capes**. The lower 5 miles of the river are within the **Aberdeen Proving Ground**. A flashing red light is shown on **Pond Point**, on the east side 3.5 miles above the mouth, at night when firing is in progress; see 204.30, chapter 2, for limits and regulations of the restricted area.

The river has minimum depths of 7 feet to the railroad bridge 6.3 miles above the mouth, thence 5 to 6 feet for

another 1.5 miles. The approach to the river and the channel inside are marked as far as **Tapler Point**, on the west side 3.5 miles above the mouth. The mean range of tide is 1.4 feet.

The railroad bridge 6.3 miles above the mouth of **Bush River** has a 35-foot bascule span with a clearance of 13 feet; see 203.245, chapter 2, for drawspan regulations. The power cable at the bridge has a clearance of 35 feet. A high-voltage power cable about 200 yards below the bridge has a clearance of 43 feet and is supported by towers on either bank and a tower near midriver; a privately maintained light is shown from the southeast leg of the middle tower.

**Otter Point Creek**, on the west side of **Bush River** 0.5 mile above the railroad bridge, has depths of 5 feet for a mile above the entrance.

Gasoline, some supplies, and slips are available above the **Bush River** railroad bridge. The largest haul-out capacities for repairs are: railway, 45 feet; lift, 14 tons.

**Still Pond**, a bight on the southeast side of **Chesapeake Bay** 154.7 miles above the **Virginia Capes**, has general depths of 9 to 11 feet and is a good anchorage for small craft during easterly winds. **Churn Creek**, which empties into the southwest corner of the bight, has depths of 2 feet in the very narrow entrance and deeper water inside. **Stillpond Creek**, at the southeast corner of the bight, has depths of 3 feet in the very narrow entrance and 4 to 8 feet inside for 2 miles, nearly to the head.

A flashing red light is shown on **Meeks Point**, on the north side of **Still Pond**, at night when firing is in progress; see 204.30, chapter 2, for limits and regulations of the restricted area.

**Sassafras River** joins **Chesapeake Bay** from eastward 159 miles above the **Virginia Capes**. The entrance is between **Howell Point**, marked by a light and a fog signal, and **Grove Point**, 3.5 miles east-northeastward; the entrance width normal to the channel is about 1 mile. The river is used by vessels drawing up to 12 feet, but the usual draft is 6 feet or less.

The river channel has depths of 13 feet or more to a point a mile above the **Fredericktown-Georgetown** bridge, thence 7 to 3 feet for another 2 miles. The channel is broad and straight for the first 4 miles, then is narrow and crooked in places but is marked as far as the highway bridge 10 miles above the mouth. The mean range of tide is 1.7 feet at **Betterton** and 2 feet at **Georgetown**.

**Betterton** is a summer resort on the south side of **Sassafras River** 2 miles eastward of **Howell Point**. The principal wharf has depths of 9 feet at the outer end. Excursion boats from **Baltimore** call at the wharf during the summer. Gasoline and some supplies are available in the summer.

**Turner Creek**, on the south side of **Sassafras River** 4.5 miles above the mouth, has depths of at least 7 feet in a very narrow, unmarked entrance and 5 feet for 0.6 mile upstream. The creek has several small landings along its shores and is much traveled by local pleasure boats.

**Kentmore Park** is a small community on the south side of Sassafras River 5 miles above the mouth. The community wharf has depths of 7 feet at the upper end.

**Fredericktown**, on the north side, and **Georgetown**, on the south side of Sassafras River 10 miles above the mouth, are connected by a highway bridge that has a 40-foot bascule span with a clearance of 4 feet. Many yachts and pleasure craft harbor here.

Numerous small-craft facilities are on both sides of the river just below the bridge. Fuel, supplies, and slips are available. The largest haul-out capacities for repairs are: railway, 85 feet; lift, 45 tons.

The unmarked channel in Sassafras River above the bridge is narrow in places and difficult to follow without local knowledge. A marina on the south side of the river a mile above the bridge has gasoline and some supplies; a 20-ton lift can haul out boats for repairs.

**Spesutie Narrows**, on the northwest side of Chesapeake Bay 150 miles above the Virginia Capes, is between the mainland and **Spesutie Island**, close to the eastward. A dredged channel with depths of 8 to 11 feet leads from the flats of the same depths off the southern entrance into and along the narrows to the Army landings; the entrance channel is marked by lighted ranges and buoys, and the inner channel is marked by buoys.

The upper end of the narrows is closed by a solid-fill causeway.

Spesutie Island and Spesutie Narrows are within the Aberdeen Proving Ground. A flashing red light is shown on **Mulberry Point**, on the westside of Spesutie Narrows a mile above the south entrance, at night when firing is in progress; see 204.30, chapter 2, for limits and regulations of the restricted area.

**Elk River**, on the east side of Chesapeake Bay 162 miles above the Virginia Capes, is the approach to the Chesapeake and Delaware Canal, which is described in chapter 7. The entrance to the river is between **Grove Point** and **Turkey Point**, 3 miles north-northeastward; the latter point is a thinly wooded bluff with abrupt slopes at the south end. A light is shown from a white tower on the bluff. The entrance width normal to the channel is about a mile.

The mean range of tide is 2.1 feet at the entrance to Elk River and 2.3 feet at the head. The current velocity is 0.6 knot.

**Local magnetic disturbance.**—Differences of 3° to 8° from normal variation have been observed in Elk River channel from Grove Point to Courthouse Point.

**Bohemia River**, on the east side of Elk River 5 miles above the mouth, has depths of 7 feet or more for 4 miles to the junction of **Great Bohemia Creek** and **Little Bohemia Creek**, thence 6 to 4 feet for 1.5 miles in Great Bohemia Creek and 7 feet for a mile in Little Bohemia Creek. The channel is broad and easy to follow for 2 miles above the entrance, then becomes very narrow and crooked.

The cove on the southwest side of Bohemia River 3 miles above the entrance has depths of 3 to 5 feet and is much used as a small-boat anchorage.

A highway bridge 3.6 miles above the mouth of Bohemia River has a 40-foot bascule span with a clearance of 12 feet; see 203.245, chapter 2, for drawspan regulations.

There are small-craft facilities along Bohemia River. Depths of 6 feet lead to a boat basin on the north side 1.5 miles from the entrance. Gasoline, some supplies, and slips are available; a marine railway can haul out boats up to 40 feet in length for repairs. The facilities on the south side below the bridge have gasoline, supplies, and slips; largest haul-out capacity for repairs is a 20-ton lift.

**Old Town Point Wharf**, on the southeast side of Elk River 7 miles above the mouth, has depths of 10 feet at the outer end. This is a government wharf and a reporting station for the west end of the Chesapeake and Delaware Canal.

**Back Creek**, on the east side of Elk River 9 miles above the mouth and 171.4 miles above the Virginia Capes, is the route of the Chesapeake and Delaware Canal and has been described in chapter 7.

Above Back Creek, the natural channel in Elk River has depths of 9 to 5 feet for 6 miles to the junction of **Big Elk Creek** and **Little Elk Creek**, 15 miles above the mouth. The channel is narrow and crooked in places but is marked by buoys to within a mile of the junction.

Small-craft facilities are on both sides of Elk River 5 miles above Old Town Point Wharf. Gasoline, some supplies, and slips are available; largest haul-out lift for repairs is 10 tons.

**Big Elk Creek**, on the east, and **Little Elk Creek**, on the west, have depths of 3 feet to the fixed highway bridges 0.6 and 0.4 mile above their respective mouths. The channels in each are narrow and crooked with numerous snags and shoals that are unmarked. Extreme caution is advised beyond the junction. **Elkton**, between the creeks and 16 miles above the mouth of Elk River, is on the main line of the Pennsylvania Railroad and has several industrial plants.

The natural channel of Chesapeake Bay turns northward off the mouth of Elk River and splits into two branches between Turkey Point and Spesutie Island, 2.3 miles to the westward. One branch rounds Spesutie Island and continues northward to Susquehanna River; the other hugs the west side of Turkey Point and high thickly wooded **Elk Neck**, and continues to Northeast River. The flats between the two branches are very shallow, and large areas bare at low water.

**Fishing Battery Light** (39°29.7' N., 76°05.0' W.), 38 feet above the water, is shown from a black skeleton tower on the battery on the east side of the channel leading to Susquehanna River; the light is 167.1 miles above the Virginia Capes. Near the light are a house and a few

trees. A shallow channel leads from the main channel to a basin on the west side of the light.

**Swan Creek**, on the western shore of Chesapeake Bay opposite Fishing Battery Light, has depths of 4 feet in the entrance and 3 to 10 feet inside for about 2 miles. The creek is little used except by boats of the U.S. Army.

**Susquehanna River** empties into the head of Chesapeake Bay from northwestward 170.1 miles above the Virginia Capes. The entrance is between **Concord Point**, marked by a light, and **Perry Point**, a mile east-northeastward. Controlling depth in the marked entrance channel through the flats to Havre de Grace is about 6½ feet. The mean range of tide is 1.7 feet at Havre de Grace and 2.1 feet at Port Deposit. The river usually is entirely closed by ice for about 3 months during the winter, but ice gorges and freshets are infrequent because of the dams upstream.

**Havre de Grace**, on the west side of the entrance to Susquehanna River, is on the main lines of the Pennsylvania Railroad and the Baltimore and Ohio Railroad. The town has little waterborne commerce, but many pleasure craft base there; most of the wharves are in poor condition. The oil wharf just above the first bridge has depths of about 10 feet alongside.

A rock covered 6 feet and marked by buoys on the east and west sides, is about 200 yards off the Havre de Grace wharves and 500 yards below the drawspan of the first bridge. There are said to be several other rocks between this rock and the wharves that require local knowledge to avoid.

The railroad bridge 0.8 mile above the mouth has a swing span with a clearance of 52 feet; see 203.245, chapter 2, for drawspan regulations. The overhead power cable on the lower side of the bridge has a clearance of 127 feet. Stone piers of a former highway bridge, just below the railroad bridge, stand 15 feet above high water. The remaining three fixed bridges between Havre de Grace and Port Deposit have minimum clearance of 86 feet.

There are berthing and repair facilities for small craft at Havre de Grace. Fuel and supplies are available; largest haul-out capacities are: railway, 50 feet; lift, 12 tons. One of the basins is protected by old railroad barges sunk in place.

**Perryville**, on the opposite side of the river from Havre

de Grace, has berthing and repair facilities for small craft above the first bridge. Gasoline and some supplies are available; largest haul-out capacities are: railway, 40 feet; lift, 20 tons.

Above Havre de Grace, depths of 13 to 50 feet are in the channel of Susquehanna River to **Port Deposit**, on the northeast side 4 miles above the mouth; the river is obstructed by rocks above this point.

**Garrett Island**, 0.8 mile long and 0.4 mile broad, high and wooded, is in midriver a mile above the mouth. The favored channel is west of the island, passing through and second opening west of the island in the Baltimore and Ohio Railroad bridge.

Port Deposit has a large manufacturing company that builds barges, derricks, boats, and hoisting equipment. The marinas at the south end of the town have berthing and engine repair facilities; largest lift, 10 tons. Gasoline is available.

**Conowingo Dam** is about 10 miles above the mouth of Susquehanna River.

**Northeast River** empties into the head of Chesapeake Bay 4.5 miles eastward of Susquehanna River and 169.1 miles above the Virginia Capes. The entrance is between **Red Point**, which is 5 miles north-northeastward of Turkey Point, and **Carpenter Point**, on the west. The only commercial traffic on the river is in seafood products, but yachtsmen use it extensively.

The controlling depth from the entrance through the flats is 7 feet to within a mile of a dam at the head of navigation. The channel is well marked by buoys for most of its length. The mean range of tide is 1.9 feet.

Extensive small-craft facilities with depths of 5 to 9 feet are at **Hance Point**, on the east side of Northeast River 2 miles above the mouth; at **Charlestown**, on the west side 2.5 miles above the mouth; and at **Northeast Heights**, on the east side 3 miles above the mouth. Fuel, supplies, and slips are available; largest haul-out capacities for repairs are: railway, 65 feet; lift, 40 tons.

See appendix for storm warning display.

**North East**, at the head of navigation 4.5 miles above the mouth of Northeast River, has good rail and highway connections. The controlling depth is about 7 feet to the town where gasoline and some supplies are available at a few of the fish piers.

## APPENDIX

**COAST AND GEODETIC SURVEY.**—Coast Pilots, Nautical Charts, Tide Tables, Tidal Current Tables, and Tidal Current Charts are sold by the Director, U.S. Coast and Geodetic Survey, Washington Science Center, Rockville, Md., 20852 (Counter sales: Room 1125, Commerce Building, Washington, D.C.), or its distribution centers at New York and San Francisco, and by authorized sales agents located in many ports of the United States and in some foreign ports.

**Distribution centers:** New York Field Office, U.S. Coast and Geodetic Survey, Room 602, Federal Office Bldg., 90 Church Street, New York, N.Y., 10007; West Coast Field Director, U.S. Coast and Geodetic Survey, Room 121, Customhouse, San Francisco, Calif., 94126.

**Field office:** Atlantic Marine Center and East Coast Field Director, U.S. Coast and Geodetic Survey, 439 West York Street, Norfolk, Va., 23510.

### Coast Pilot books:

- U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod, 1965.
- U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook, 1960.
- U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, 1966.
- U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West, 1964.
- U.S. Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands, 1962.
- U.S. Coast Pilot 7, Pacific Coast and Hawaii, 1963.
- U.S. Coast Pilot 8, Alaska—Dixon Entrance to Cape Spencer, 1962.
- U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska—Cape Spencer to Beaufort Sea, 1964.

Distances Between United States Ports, Third (1961) Edition.

A Coast Pilot should be used only by reference to the latest supplement which can be obtained free from the headquarters office and distribution centers of the Coast and Geodetic Survey, and from the sales agents.

### Tide Tables:

- Europe and West Coast of Africa.
- East Coast, North and South America.
- West Coast, North and South America.
- Central and Western Pacific Ocean and Indian Ocean.

### Tidal Current Tables:

- Atlantic Coast, North America.
- Pacific Coast, North America and Asia.

### Tidal Current Charts:

- Boston Harbor.
- Narragansett Bay to Nantucket Sound.
- Narragansett Bay.
- Long Island Sound and Block Island Sound.
- New York Harbor.
- Delaware Bay and River.
- San Francisco Bay.
- Puget Sound, Northern Part.
- Puget Sound, Southern Part.

**PUBLICATIONS.**—A résumé of the U.S. Government publications of navigational value is included for the ready reference of the mariner. In addition to the agents located in the principal seaports handling sales publications, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

**Nautical Charts.**—Coasts of the United States and Possessions: Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its agents.

Mississippi River (Cairo, Ill., to Gulf of Mexico): Published and for sale by Mississippi River Commission, Vicksburg, Miss.

Mississippi River (Cairo, Ill., to Minneapolis, Minn.) and Illinois Waterway (Mississippi River to Lake Michigan): Published and for sale by the U.S. Army Engineer District, Chicago, Ill.

Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada: Published and for sale by U.S. Lake Survey, Detroit, Mich.

Foreign countries: Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

**Coast Pilots.**—Coasts of the United States and Possessions: Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

Great Lakes Pilot: Published and for sale by U.S. Lake Survey, Detroit, Mich.

Foreign countries (Sailing Directions): Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

**Tide and Tidal Current Tables, and Tidal Current Charts.**—Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

**Notices to Mariners** may be obtained free from the following: Local Notices to Mariners—District Commander of the local Coast Guard district; Weekly Notice to Mariners, Part I (Atlantic and Mediterranean) and Part II

(Pacific and Indian Oceans)—U.S. Naval Oceanographic Office; Weekly Notice to Mariners, Great Lakes—Commander, Ninth Coast Guard District, Cleveland, Ohio.

**Light Lists.**—United States and Possessions: Published by U.S. Coast Guard; for sale by the Superintendent of Documents and his sales agents. 5

Foreign countries: Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

**Radio.**—Radio Navigational Aids, Atlantic and Mediterranean Area (H.O. Pub. No. 117A); Radio Navigational Aids, Pacific and Indian Oceans Area (H.O. Pub. No. 117B); Radio Weather Aids, Atlantic and Mediterranean Area (H.O. Pub. No. 118A); Radio Weather Aids, Pacific and Indian Oceans Area (H.O. Pub. No. 118B); Weather Station Index (H.O. Pub. No. 119); and International Code of Signals, Vol. II—Radio (H.O. Pub. No. 104); Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents. 15

**Miscellaneous.**—The Nautical Almanac, and American Ephemeris and Nautical Almanac: Published by United States Naval Observatory: for sale by Superintendent of Documents and his sales agents. 20

American Practical Navigator (Bowditch) (H.O. Publication No. 9), and International Code of Signals, Volume I—Visual (H.O. Publication No. 103): Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents. 25

Rules of the Road, International—Inland (CG-169). Rules of the Road, Western Rivers (CG-184). Rules of the Road, Great Lakes (CG-172): Published by and free on application to the U.S. Coast Guard. 30

Port Series of the United States: Part I (port administration and services) published by Maritime Administration, U.S. Department of Commerce; Part II (port conditions and facilities) published by Corps of Engineers, U.S. Army. Both parts are for sale by the Superintendent of Documents. 35

**CORPS OF ENGINEERS, U.S. ARMY.**—New York District Office: 111 East 16th St., New York, N.Y., 10003. 40

The New York District includes all Atlantic coastal ports included in this Coast Pilot from Sandy Hook, N.J., to a point just north of Manasquan Inlet.

**Philadelphia District Office:** Custom House, 2d and Chestnut Sts., Philadelphia, Pa., 19106. 45

The Philadelphia District includes all ports from a point just north of Manasquan Inlet, N.J., southerly to the Maryland boundary, all ports of Delaware Bay and River and tributaries, and the Chesapeake and Delaware Canal. 50

**Baltimore District Office:** 24th and Maryland Ave., Baltimore, Md., 21203. The Baltimore District includes the ports in Chesapeake Bay and its tributaries generally northward of the Maryland-Virginia line, except the Chesapeake and Delaware Canal, and including Potomac River and tributaries upstream from Smith Point. 55

**Norfolk District Office:** 803 Front St., Norfolk, Va., 23510. The Norfolk District includes all the Virginia

ports north to the Maryland-Virginia line, extended westward to Smith Point, and all of Rappahannock River and its tributaries.

**COAST GUARD.**—Commander, Third Coast Guard District: Customhouse, New York, N.Y., 10004. Waters of jurisdiction: Rhode Island from Watch Hill, Connecticut, New York, New Jersey, Pennsylvania, and Delaware, but excluding the Chesapeake and Delaware Canal.

**Captain of the Port Office:**

Philadelphia, Pa.: Coast Guard Base, Gloucester, N.J., 08030.

**Commander, Fifth Coast Guard District:** Federal Bldg., 101 Crawford St., Portsmouth, Va., 23705. Waters of jurisdiction: Maryland, Virginia, North Carolina, District of Columbia, and the Chesapeake and Delaware Canal.

**Captain of the Port Offices:**

Baltimore, Md.: Coast Guard Yard, Curtis Bay, Baltimore, Md., 21226.

Norfolk, Va.: P.O. Box 4557, Norfolk, Va., 23523.

**Coast Guard stations.**—The stations listed here are in the areas covered by this Coast Pilot. They have search and rescue capabilities and may provide lookout, communication, and/or patrol functions to assist vessels in distress. Aerial identification numbers, where assigned, follow the name of the station.

Sandy Hook, N.J. (97), 40°28.2' N., 74°00.8' W. On the bay side, 0.5 mile south of the point of the hook.

Shark River, N.J. (103), 40°11.7' N., 74°00.6' W. Half a mile south of the mouth of Shark River.

Manasquan Inlet, N.J. (105), 40°06.2' N., 74°02.2' W. Quarter mile west of inlet entrance, south side.

Barneget, N.J. (113), 39°45.5' N., 74°06.4' W. On Long Beach at Barneget City, 0.5 mile south-southeast of abandoned light tower.

Bonds, N.J. (118), 39°33.0' N., 74°15.0' W. At Beach Haven, 3 miles north of Beach Haven Inlet.

Atlantic City, N.J. (123), 39°22.7' N., 74°25.4' W. Near Absecon Inlet entrance, on north side of Clam Creek opposite Gardiner Basin.

Great Egg, N.J. (126), 39°17.7' N., 74°33.8' W. Inside Great Egg Harbor Inlet at Ocean City, 0.4 mile southward of bridge.

Townsend Inlet, N.J. (130), 39°07.9' N., 74°42.4' W. North side of the inlet, 2.5 miles southwest of Ludlum Beach Light.

Cape May, N.J. (137), 38°58.0' N., 74°57.1' W. On north bank of west entrance to Cape May Canal.

Gloucester City, N.J., 39°53.9' N., 75°07.7' W. On east side of Delaware River, 700 yards south of Walt Whitman Bridge.

Lewes, Del. (139), 38°46.9' N., 75°07.2' W. About 2.5 miles southwest of Harbor of Refuge Light.

Indian River Inlet, Del. (142), 38°36.6' N., 75°04.1' W. On the north shore inside the inlet.

Ocean City, Md. (146), 38°19.7' N., 75°05.4' W. On Philadelphia Avenue between South Division and Worcester Streets.

Assateague Beach, Va. (150), 37°51.7' N., 75°22.0' W. On southeastern point of Assateague Island, 3 miles southwest of Assateague Light.

Chincoteague, Md., 37°55.9' N., 75°23.0' W. On east side of Chincoteague Channel 0.3 mile south of bridge.

Parramore Beach, Va. (154), 37°34.4' N., 75°37.0' W. On west side of Parramore Island, about half a mile south of Wachapreague Inlet.

Virginia Beach, Va. (162), 36°51.2' N., 75°58.5' W. On beach front, 5 miles south of Cape Henry Light.

Little Creek, Va. (161), 36°54.7' N., 76°10.7' W. About a mile south of entrance to Little Creek, 4.5 miles west of Lynnhaven Inlet.

Norfolk, Va., 36°49.5' N., 76°17.3' W. At Berkley, on east side of Southern Branch, 1.2 miles south of junction with Eastern Branch.

Piney Point, Md., 38°08.1' N., 76°31.7' W. Just east of point.

Potomac River, Dahlgren, Va., 38°19.2' N., 77°02.2' W. Annapolis, Md., 38°58.1' N., 76°28.6' W. Just inside Back Creek on north side.

Tilghman Island, Md., 38°43.1' N., 76°20.0' W. On south side of Knapps Narrows just east of bridge.

Baltimore, Md., 39°11.9' N., 76°34.2' W. At Curtis Bay Coast Guard Base in Arundel Cove.

**CUSTOMS.**—The three Customs Districts described in this volume are within the **Baltimore Region**. In the following listing of ports of entry, the first port in each district is the headquarters port. An asterisk (\*) precedes the names of those ports authorized to issue marine documents.

**Philadelphia District:** \*Philadelphia and Chester, Pa.; \*Wilmington, Del.

**Baltimore District:** \*Baltimore, \*Annapolis, \*Cambridge, and \*Crisfield, Md.; \*Washington, D.C.

**Norfolk District:** \*Norfolk and \*Newport News, \*Alexandria, \*Cape Charles City, Petersburg, \*Reedville, and Richmond, Va.

**PUBLIC HEALTH SERVICE.**—Quarantine stations where supervision of quarantine and medical examination of aliens are performed:

Baltimore, Md., Room 426, U.S. Customhouse, Gay and Lombard Sts.

Philadelphia, Pa., Marcus Hook, Delaware Ave. and Market St.

Fort Monroe, Va., waterfront.

Additional places where quarantine and/or medical examination of aliens are performed:

Annapolis, Cambridge, Salisbury, and Piney Point, Md.; Washington, D.C. (Dulles International Airport); Atlantic City, Burlington, Camden, Cape May, Eagle Point, Paulsboro, Pennsauken, and Trenton, N.J.; Bom-

bay Hook anchorage, Delaware City, Lewes, and Wilmington, Del.; Chester and Morrisville, Pa.; Alexandria, Cheatham Annex, Craney Island, Hopewell, Newport News, Norfolk, Portsmouth, Richmond, West Point, and Yorktown, Va.

#### Hospitals:

Baltimore, Md.: Wyman Park Dr. and 31st St., 21211.

Norfolk, Va.: 6500 Hampton Blvd., Larchmont, 23508.

#### Outpatient Clinics:

Philadelphia, Pa.: 225 Chestnut St., 19106.

Washington, D.C.: Health, Education, and Welfare Bldg., 4th and D Sts. SW., 20201.

#### Outpatient Offices:

Cambridge, Md., 6 Church St.; Cape May, N.J., Columbia Ave. and Ocean St.; Crisfield, Md., 322 Main St.; Kilmarnock, Va.; Lewes, Del., 821 Savannah Rd.; Newport News, Va., 129 28th St.; Reedville, Va.; Richmond, Va., 714 North Blvd.; Wilmington, Del., 1411 North Van Buren St.

**IMMIGRATION and NATURALIZATION.**—Offices of these services are in the following ports covered by this Coast Pilot:

**Regional Office:** Room 6226, 400 North 8th St., Richmond, Va., 23240.

**District Offices:** Baltimore, Md., 707 North Calvert St., 21202; Philadelphia, Pa., 128 North Broad St., 19102; Washington, D.C., 311 Old Post Office Bldg., 12th and 30 Pennsylvania Ave. NW., 20536.

**FEDERAL COMMUNICATIONS COMMISSION.**—District field offices of the Commission in this area are:

Philadelphia, Pa., 1005 New U.S. Customhouse.

Baltimore, Md., 415 U.S. Customhouse, Gay and Water Sts.

Washington, D.C., Room 204, 521 12th St. NW.

Norfolk, Va., 405 Federal Bldg.

**WEATHER BUREAU.**—Barometers may be compared with standards at the following offices:

Philadelphia: New Terminal Bldg., International Airport.

Atlantic City: Airport Station, Atlantic City Airport. Baltimore: Weather Bureau Station, Friendship International Airport.

Washington, D.C.: Washington National Airport.

Norfolk, Va.: Weather Bureau, Room G-6, U.S. Customhouse, 101 E. Main St.

**Broadcasts by Coast Guard radio stations.**—Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States, including Puerto Rico and the U.S. Virgin Islands. Transmissions are as follows:

**Urgent and safety broadcasts:**

(1) **By radiotelegraph:** (a) Upon receipt, except within 10 minutes of the next silent period, for urgent messages only; (b) during the last 15 seconds of the first silent period after receipt; (c) repeated at the end of the first silent period which occurs during the working hours of one-operator ships unless the original warning has been cancelled or superseded by a later warning message.

(2) **By radiotelephone:** (a) Upon receipt; (b) repeated 15 minutes later, for urgent messages only; (c) additional broadcasts at the discretion of the originator.

(3) Urgent broadcasts are preceded by the urgent signal: XXX for radiotelegraph; PAN for radiotelephone. Both the urgent signal and message are transmitted on 500 kc. and 2182 kc., respectively. Safety broadcasts are preceded by the safety signal: TTT for radiotelegraph; SECURITE for radiotelephone. After the preliminary signal 500 kc. and 2182 kc., the station shifts to its assigned working medium frequency for the radiotelegraph broadcast and 2670 kc. for the radiotelephone transmission.

**Scheduled broadcasts.**—The following Coast Guard radio stations make scheduled broadcasts, preceded by a preliminary call on 500 kc. and 2182 kc., at the times and frequencies indicated:

**Radiotelegraph:**

NMY, New York, N.Y., 486 kc., 1200 and 2000 e.s.t.

NMN, Portsmouth, Va., 466 kc., 1120 and 2020 e.s.t.

**Radiotelephone:**

NMY, New York, N.Y., 2670 kc., 0720 and 1920 e.s.t.

NMK, Cape May, N.J., 2670 kc., 0600 and 1800 e.s.t.

NMX, Baltimore, Md., 2670 kc., 1230 e.s.t.

NMN, Portsmouth, Va., 2670 kc., 0020 and 1220 e.s.t.

**Voice distress, safety, and calling frequencies guarded by the Coast Guard.**—The International radiotelephone distress and calling frequency 2182 kc. and the International calling and safety frequency 156.8 mc. of the maritime mobile VHF-FM band are guarded continuously in the area covered in this book by the Coast Guard stations listed below. Stations preceded by an asterisk (\*) guard 156.8 mc. only, and those preceded by a dagger (†) guard 2182 kc. only.

**New Jersey:** Sandy Hook, Shark River, Manasquan Inlet, Barnegat, Bonds, Atlantic City, Great Egg (Ocean City), Townsend Inlet, Cape May, and Gloucester City.

**Delaware:** Lewes and Indian River Inlet.

**Maryland:** Ocean City, Piney Point, †Thomas Point Shoal Light Station, Annapolis, Tilghman Island, and Baltimore (Curtis Bay).

**Virginia:** Assateague Beach, Chincoteague, Parramore Beach, \*Virginia Beach, Norfolk (Berkley), \*Wolf Trap Light Station, Potomac River (Dahlgren), and †Alexandria (Washington Radio).

**Radiotelephone broadcasts of weather information.**

Regular broadcasts of weather forecasts, storm warnings, and other information are made in plain language by commercial coastal harbor radiotelephone stations. Regular scheduled broadcasts are:

WAQ, Ocean Gate, N.J., 2558 kc. at 0715 and 1915 e.s.t.

WBH, Wilmington, Del., 2558 kc. at 0730 and 1930 e.s.t.

WGB, Norfolk, Va., 2538 kc. and 2450 kc.\* at 0000, 0600, 1200, and 1800 e.s.t.

\*Sunrise to sunset.

**Weather broadcasts by harbor radiotelegraph stations.**—Regular broadcasts of weather forecasts (storm warnings on receipt) and other weather information are made by commercial coastal harbor radiotelegraph stations as follows:

WSC, Tuckerton, N.J., 460 kc. at 0818 and 1818 e.s.t.

WMH, Baltimore, Md., 428 kc. at 0830, 1030, 1430, and 2030; on 8686 kc. at 0830, 1030, 1430, and 2030; and on 12952.5 kc. at 0830, 1030, and 1430, e.s.t.

**Commercial radio station weather broadcasts.**—Taped or direct broadcasts of forecasts and storm warnings are made by commercial radio stations in the areas covered by this Coast Pilot. These usually are made several times daily; broadcast times are published in local newspaper radio program schedules, and in the Coastal Warning Facilities Charts issued annually by the U.S. Weather Bureau. The charts are on sale, 10 cents each, by Superintendent of Documents, Washington, D.C., 20402.

**STORM WARNING STATIONS.**—Weather Bureau listings of display stations in the area covered by this Coast Pilot follow: DN indicates day and night display; D, day display only; S, seasonal display.

**New Jersey:**

- DN Sandy Hook Coast Guard Station; 40°28.3', 74°00.8'.
- 40 D Shark River Coast Guard Station; 40°11.7', 74°00.6'.
- DN Manasquan Inlet Coast Guard Station; 40°06.2', 74°02.3'.
- D Burlington; 40°04.9', 74°51.0' (S).
- D Bay Head, Manasquan; 40°04.2', 74°03.7'.
- 45 D Bay Head; 40°03.9', 74°02.9' (S).
- D Lanoka Harbor; 39°52.2', 74°02.2' (S).
- D Barnegat Lightship; 39°45.8', 73°56.0'.
- D Barnegat Coast Guard Station; 39°45.5', 74°06.3'.
- D Bonds Coast Guard Station; 39°33.3', 74°15.0'.
- 50 D Brigantine; 39°24.5', 74°22.2' (S).
- D Atlantic City Coast Guard Station; 39°22.7', 74°25.4'.
- D Atlantic City, Kentucky Ave.; 39°21.4', 74°25.7' (S).
- D Great Egg Coast Guard Station; 39°17.7', 74°33.8'.
- 55 DN Bivalve; 39°14.1', 75°02.1'.
- D Townsend Inlet Coast Guard Station; 39°07.7', 74°42.6'.
- D Cape May; 38°56.8', 74°53.3'.
- D Five Fathom Bank Lightship; 38°47.3', 74°34.6'.

**Delaware:**

- DN Delaware Breakwater; 38°47.0', 75°07.0'.  
 D Indian River Inlet Coast Guard Station; 38°36.6',  
 75°04.1'.  
 D Delaware Lightship; 38°27.3', 74°35.1'.

**Maryland:**

- D North East; 39°34.4', 75°57.3' (S).  
 D Elk River, Herring Island; 39°30.8', 75°52.6'.  
 D Frog Mortar Creek, Middle River; 39°19.3', 76°24.1'  
 (S).  
 D Sue Island; 39°17.3', 76°23.8'.  
 D Fairlee Creek, Great Oak; 39°15.9', 76°12.3' (S).  
 D Chestertown, Rolphs Point; 39°10.5', 76°02.2' (S).  
 D Rock Hall; 39°08.4', 76°15.7'.  
 D Gibson Island; 39°05.1', 76°25.4'.  
 D Chester, Castle Marina; 38°59.2', 76°17.1'.  
 DN Annapolis, Naval Academy; 38°58.9', 76°28.8'.  
 D Shady Side; 38°50.2', 76°31.9' (S).  
 DN Cambridge Yacht Club; 38°34.6', 76°04.4'.  
 D Ocean City; 38°19.8', 75°05.1'.  
 D Solomons Back Creek; 38°19.7', 76°27.2'.

- D Fishing Creek; 38°19.3', 76°13.3'.  
 DN Tall Timbers; 38°10.6', 76°32.6' (S).  
 DN Crisfield, Somers Cove Marina; 37°58.7', 75°51.5'.

**5 District of Columbia:**

- D Washington, Corinthian Yacht Club; 38°51.9',  
 77°00.9'.

**10 Virginia:**

- D Arlington Pentagon Lagoon; 38°52.5', 77°03.0'.  
 D Alexandria, Old Town Yacht Basin; 38°48.0',  
 77°02.5'.  
 15 D Windmill Point; 37°36.9', 76°17.4'.  
 D Oyster; 37°17.2', 75°55.5'.  
 D Fort Eustis; 37°10.0', 76°36.5'.  
 DN Fort Monroe; 37°00.1', 76°18.5'.  
 D Chesapeake Light; 36°54.3', 75°42.8'.  
 20 DN Newport News; 36°58.3', 76°25.9'.  
 DN Norfolk Navy Base; 36°57.1', 76°20.0'.  
 DN Norfolk, Lafayette Yacht Club; 36°53.3', 76°16.9'.  
 DN Norfolk, Royster Building; 36°50.9', 76°17.5'.  
 DN Cape Henry; 36°55.8', 76°00.5'.  
 25 DN Little Creek; 36°55.0', 76°10.5'.

# APPENDIX CLIMATOLOGICAL TABLES

These tables were compiled from Weather Bureau data. Sky cover is expressed in a range of 0 for no clouds to 10 for complete sky cover. The number of days is based on average cloudiness of 0 to 3, partly cloudy days on 4 to 7, and cloudy days on 8 to 10.

Heavy fog includes data referred to at various times in the past

as "Dense" or "Thick". The upper visibility limit for heavy fog is  $\frac{1}{4}$  mile.

(a) means length of record in years.

(b) means climatological standard normals, 1931-1960.

\* means less than one-half.

T means trace, an amount too small to measure.

NEW YORK, N. Y. (Weather Bureau Office) 40°47'N., 73°58'W. Elevation (ground) 132 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	97	97	(b)	54	97	46	46	45	45	19	89	41	41	41	41	97	95	5	
Jan.	39.5	26.9	33.2	72	-6	3.31	3.33	7.8	68	60	9.6	NW	41NW	50	6.1	8	9	14	11	2	0	
Feb.	40.3	26.4	33.4	75	-15	2.84	2.96	8.5	68	59	9.6	NW	41NE	55	5.8	8	9	11	10	2	0	
Mar.	47.8	33.2	40.5	86	3	4.01	4.25	5.3	67	55	9.8	NW	52NW	57	5.7	9	10	12	12	2	*	
Apr.	59.6	43.1	51.4	92	12	3.43	2.67	1.0	68	53	9.3	NW	39NE	59	5.9	8	10	12	11	*	1	
May	71.4	53.4	62.4	99	32	3.67	3.82	T	71	53	7.8	SW	33W	62	5.7	8	12	11	11	0	3	
June	80.2	62.5	71.4	101	44	3.31	4.74	0.0	74	55	7.2	SW	43SW	65	5.6	8	12	10	10	0	4	
July	85.3	68.2	76.8	106	52	3.70	3.56	0.0	76	56	6.8	SW	37NW	66	5.5	8	13	10	11	0	3	
Aug.	83.3	66.8	75.1	104	50	4.44	4.80	0.0	79	58	6.8	SW	31NE	64	5.5	9	12	10	10	0	3	
Sept.	76.8	60.1	68.5	102	39	3.87	8.30	0.0	80	58	7.2	SW	38NE	63	5.2	11	10	9	8	0	1	
Oct.	66.3	50.3	58.3	94	28	3.14	11.17	T	76	55	8.0	SW	35NE	61	4.9	12	9	10	8	0	1	
Nov.	53.7	40.3	47.0	84	5	3.39	3.81	1.0	73	59	8.9	NW	61NE	53	5.8	9	9	12	9	*	0	
Dec.	42.1	29.7	35.9	70	-13	3.26	3.21	6.1	69	60	9.1	NW	37NW	50	5.9	9	9	13	10	2	0	
Year	62.2	46.7	54.5	106	-15	42.37	11.17	29.7	72	57	8.3	NW	61NE	60	5.6	107	124	134	121	8	16	

NEWARK, N. J. (Newark Airport) 40°42'N., 74°10'W. Elevation (ground) 11 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)		Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days							
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction			Maximum speed and direction	Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	24	24	(b)	12	24	24	24	21	22		20	24	24	24	24	24	24	24	
Jan.	40.5	26.0	33.3	74	0	3.33	1.78	7.5	72	59	9.7	NE		6.5	8	7	16	11	2	*	3	
Feb.	41.7	25.7	33.7	76	-7	2.80	2.45	7.5	70	56	10.0	NW		6.4	7	8	13	10	2	*	2	
Mar.	49.8	33.1	41.5	89	6	4.09	2.37	5.5	67	52	10.5	NW		6.1	8	9	14	12	1	1	2	
Apr.	62.9	41.7	52.3	91	23	3.51	2.01	0.6	69	49	9.7	WNW		6.5	7	9	14	12	*	2	2	
May	73.1	51.9	62.5	98	33	3.65	1.11	T	71	51	8.7	SW		6.4	7	11	13	12	0	4	2	
June	82.3	62.2	72.3	102	43	3.44	1.52	0.0	72	51	8.1	SW		6.0	7	12	11	10	0	5	2	
July	87.1	67.5	77.3	105	52	3.67	3.15	0.0	74	51	7.6	SW		6.1	7	12	12	10	0	6	1	
Aug.	84.8	65.9	75.4	103	50	4.43	4.17	0.0	78	53	7.4	SW		6.0	8	12	11	9	0	4	1	
Sept.	78.0	58.6	68.3	105	35	3.76	4.06	0.0	80	53	7.6	SW		5.5	11	8	11	8	0	2	1	
Oct.	67.2	48.0	57.6	92	30	3.11	2.53	T	79	52	8.1	SW		5.2	12	8	11	8	0	1	3	
Nov.	53.5	38.3	45.9	85	15	3.37	2.09	0.4	76	55	8.8	SW		6.0	9	8	13	10	*	*	2	
Dec.	42.1	28.4	35.3	72	-1	3.22	1.83	8.1	73	58	9.2	SW		6.2	9	8	14	11	2	*	2	
Year	63.6	45.6	54.6	105	-7	42.38	4.17	29.6	73	53	8.8	SW		6.1	100	112	153	122	8	26	23	

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PHILADELPHIA, Pa. (International Airport) 39°53'N., 75°15'W. Elevation (ground) 5 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)		Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days							
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction			Maximum speed and direction	Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	6	6	(b)	19	19	6	6	24	23	25	23	25	25	25	25	25	25	25	25
Jan.	40.3	24.3	32.3	57	-5	3.32	2.08	5.6	75	60	8.9	WNW	53NE	50	6.7	7	8	16	11	2	*	3
Feb.	41.8	24.6	33.2	67	-4	2.80	1.55	5.7	73	59	9.6	NW	51NW	54	6.4	7	8	13	9	1	*	3
Mar.	50.3	31.6	41.0	80	9	3.80	1.82	4.1	73	55	10.0	N	49NW	57	6.3	8	8	15	12	1	1	2
Apr.	62.6	41.4	52.0	92	25	3.40	2.03	0.1	71	50	9.6	SW	51SW	57	6.5	6	10	14	11	*	2	2
May	73.4	51.8	62.6	96	35	3.74	2.09	T	77	52	8.3	WSW	49SW	59	6.5	6	11	14	11	0	4	2
June	81.6	60.4	71.0	100	44	4.05	3.62	0.0	75	52	7.6	WSW	63NW	64	6.2	6	13	11	10	0	5	1
July	85.9	65.2	75.6	99	52	4.16	2.84	0.0	79	54	7.0	WSW	41W	63	6.1	7	12	12	9	0	6	1
Aug.	83.7	63.5	73.6	91	45	4.63	4.81	0.0	80	56	6.7	SW	58E	61	5.9	8	11	12	10	0	5	2
Sept.	77.2	56.2	66.7	94	35	3.46	5.45	0.0	83	57	7.1	SW	43NE	60	5.6	10	9	11	8	0	2	2
Oct.	66.5	44.9	55.7	85	25	2.78	3.22	T	81	50	7.6	WSW	57SW	60	5.4	12	7	12	8	*	1	4
Nov.	54.0	34.5	44.3	80	17	3.40	3.46	0.8	77	55	8.2	WSW	52SW	54	6.2	8	9	13	9	*	*	3
Dec.	42.3	25.5	33.9	68	3	2.94	1.77	4.2	74	59	8.6	WNW	41NW	51	6.3	8	9	14	9	1	*	3
Year	63.3	43.7	53.5	100	-5	42.48	5.45	20.5	76	55	8.3	WSW	63NW	58	6.2	93	115	157	117	6	27	28

TRENTON, N. J. (Federal Building) 40°13'N., 74°46'W. Elevation (ground) 56 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total			Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	33	33	(b)	33	33			32	32	33	33	22	33	33	33	33	33	32	
Jan.	40.0	26.2	33.1	72	-3	3.10	2.03	5.6			8.5	NW	42N	50	6.3	8	8	15	12	2	*	
Feb.	40.9	25.9	33.4	73	-14	2.59	2.13	6.6			8.9	NW	43W	55	6.2	8	8	12	10	2	*	
Mar.	48.8	32.5	40.7	86	8	3.84	2.55	4.6			9.3	NW	37NW	55	6.0	8	9	14	12	2	1	
Apr.	61.3	42.0	51.7	91	24	3.21	2.46	0.4			9.0	S	37N	58	6.3	7	9	14	12	*	2	
May	72.3	52.3	62.3	96	34	3.62	2.02	T			7.8	S	32NW	62	6.3	7	11	13	11	0	5	
June	80.7	61.3	71.0	100	43	3.60	4.79	0.0			7.3	S	31SE	65	5.9	7	12	11	10	0	6	
July	85.2	66.7	76.0	106	53	4.18	4.85	0.0			6.8	S	40SW	67	5.9	8	12	11	10	0	8	
Aug.	82.8	65.0	73.9	100	48	4.77	4.76	0.0			6.6	S	36N	64	5.8	8	11	12	10	0	6	
Sept.	76.2	57.9	67.1	100	36	3.50	4.01	0.0			6.9	S	49NW	63	5.5	10	9	11	8	0	3	
Oct.	65.9	47.7	56.8	94	27	2.84	3.25	0.1			7.2	N	52NW	61	5.0	12	9	10	8	*	1	
Nov.	53.6	38.0	45.8	83	14	3.16	2.37	1.0			8.0	NW	56E	54	6.0	9	9	12	9	*	*	
Dec.	42.2	28.2	35.2	70	-2	2.87	2.67	4.6			8.1	NW	42NW	50	6.1	8	9	14	10	1	*	
Year	62.5	45.3	53.9	106	-14	41.28	4.85	22.9			7.8	S	56E	60	5.9	100	116	149	122	7	33	

WILMINGTON, Del.(Greater Wilmington Airport) 39°40'N., 75°36'W. Elevation (ground) 78 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a. m. EST	1:00 p. m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	18	18	(b)	18	18	18	18	16	16		18	18	18	18	18	18	18	18	
Jan.	41.3	25.5	33.4	75	-4	3.40	1.60	5.8	76	62	8.3	WNW		6.6	7	8	16	11	2	*	5	
Feb.	42.4	25.2	33.8	74	-4	2.95	1.90	5.6	76	60	8.9	NW		6.4	7	7	14	10	2	*	4	
Mar.	50.5	32.0	41.3	86	9	4.02	2.75	4.8	75	54	9.7	WNW		6.2	8	8	15	12	1	1	3	
Apr.	62.5	41.6	52.1	89	22	3.33	2.56	0.1	74	51	9.0	WNW		6.5	7	8	15	12	*	3	3	
May	73.4	52.0	62.7	95	34	3.53	2.01	T	77	53	7.6	S		6.5	6	11	14	11	0	5	3	
June	81.8	61.0	71.4	99	44	4.07	2.67	0.0	78	53	7.1	S		5.9	8	11	11	9	0	6	2	
July	86.2	65.8	76.0	102	50	4.25	6.24	0.0	80	53	6.5	NW		6.0	7	12	12	9	0	6	2	
Aug.	84.2	64.3	74.3	101	46	5.59	4.00	0.0	84	56	6.3	S		5.8	9	10	12	10	0	6	4	
Sept.	77.9	57.3	67.6	100	37	3.95	5.62	0.0	86	55	6.8	S		5.5	11	7	12	8	0	2	3	
Oct.	67.3	45.9	56.6	91	26	2.91	2.94	T	85	53	6.9	NW		5.2	12	8	11	8	0	1	4	
Nov.	55.1	35.7	45.4	85	14	3.53	3.83	1.2	82	56	7.7	NW		6.1	9	8	13	9	*	1	4	
Dec.	43.5	26.7	35.1	71	3	3.03	1.99	3.9	78	60	7.8	WNW		6.3	8	8	15	9	1	*	4	
Year	63.8	44.4	54.1	102	-4	44.56	6.24	21.4	79	56	7.7	NW		6.1	99	106	160	118	6	30	41	

ATLANTIC CITY, N. J. (National Aviation Facilities) 39°27'N., 74°35'W. Elevation (ground) 64 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)		Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days							
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a. m. EST	1:00 p. m. EST	Mean speed	Prevailing direction			Maximum speed and direction	Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	20	20	(b)	22	21	5	5	6	5		5	7	7	7	7	22	21	7	7
Jan.	42.9	26.6	34.8	73	-8	3.56	2.86	5.1	77	58	11.1	WNW		57	5.9	9	9	13	11	1	*	3
Feb.	43.3	26.1	34.7	73	-4	3.13	1.95	3.7	77	58	10.7	W		52	6.4	7	6	15	10	1	*	5
Mar.	49.7	32.4	41.1	87	9	3.91	2.22	3.5	77	52	11.2	WNW		56	5.9	9	8	14	11	1	1	4
Apr.	60.3	41.7	51.0	89	24	3.41	3.37	0.4	73	46	10.9	S		55	6.3	7	10	13	12	*	2	3
May	71.0	51.5	61.3	96	32	3.51	4.15	0.0	77	49	9.5	S		60	6.1	6	14	11	10	0	3	3
June	79.2	60.7	70.0	100	42	2.83	2.91	0.0	81	53	8.5	S		63	6.0	7	11	12	9	0	5	3
July	83.8	66.3	75.1	98	52	3.72	6.46	0.0	83	55	8.3	S		63	6.2	8	9	14	9	0	5	4
Aug.	82.2	65.1	73.7	102	49	4.90	4.97	0.0	87	58	7.6	S		62	6.1	8	9	14	9	0	4	4
Sept.	76.0	58.3	67.2	97	35	3.31	3.98	0.0	87	57	8.8	ENE		62	5.4	11	8	11	7	0	1	2
Oct.	66.5	47.8	57.2	90	26	3.20	2.95	T	85	52	9.2	W		66	4.8	13	8	10	7	0	1	5
Nov.	55.5	37.9	46.7	84	16	3.66	3.93	0.2	83	55	10.3	W		59	5.8	10	7	13	9	*	*	3
Dec.	45.1	28.1	36.6	72	-7	3.22	2.75	2.6	78	59	10.2	WNW		49	6.1	10	7	14	9	1	*	5
Year	63.0	45.2	54.1	102	-8	42.36	6.46	15.5	80	54	9.6	S		59	5.9	105	106	154	112	4	23	44

## APPENDIX

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BALTIMORE, Md. (Custom House) 39°17'N., 76°37'W. Elevation (ground) 14 feet. WB-1964

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	94	94	(b)	94	68	60	31	24	40	39	57	80	80	80	80	94	58	67	60
Jan.	44.1	30.4	37.3	79	-6	3.43	3.73	6.1	72	58	9.0	SW	49NW	48	5.9	9	9	13	11	2	*	2
Feb.	45.3	30.3	37.8	83	-7	2.98	3.48	6.6	70	56	9.4	SW	56NW	56	5.6	9	9	10	10	2	*	2
Mar.	52.9	36.5	44.7	90	5	3.94	4.14	4.8	69	53	10.0	SW	57W	59	5.6	10	10	11	12	1	1	2
Apr.	64.7	46.6	55.7	95	15	3.71	3.99	0.6	65	50	9.8	SW	56W	59	5.5	9	10	11	11	*	2	1
May	75.1	57.1	66.1	98	34	4.15	3.89	T	67	51	8.7	SW	50NE	61	5.4	10	11	10		0	5	*
June	83.4	66.0	74.7	105	46	3.87	4.47	0.0	70	53	8.3	SW	53N	64	5.3	9	13	8	10	0	6	*
July	87.4	70.7	79.1	107	54	4.39	4.13	0.0	71	52	7.6	SW	53NE	65	5.2	10	12	9	11	0	8	*
Aug.	85.3	69.2	77.3	105	51	4.60	7.82	0.0	74	55	7.5	S	52SW	63	5.1	11	11	9	11	0	6	*
Sept.	78.8	62.4	70.6	101	39	3.63	6.07	0.0	75	56	7.7	S	47SW	64	4.9	12	9	9	8	0	3	1
Oct.	68.4	51.6	60.0	97	30	3.25	5.30	0.1	74	53	8.0	SW	43NW	63	4.7	13	9	9	8	*	1	2
Nov.	56.4	41.2	48.8	87	12	3.10	4.19	0.6	72	55	8.7	SW	50S	55	5.3	10	10	10	9	*	*	2
Dec.	45.7	32.2	39.0	75	-3	3.16	3.16	3.9	71	58	8.6	SW	49NW	49	5.7	9	10	12	10	1	*	3
Year	65.6	49.5	57.6	107	-7	44.21	7.82	22.7	71	54	8.6	SW	57W	59	5.4	121	123	121	122	6	32	15

WASHINGTON, D. C. (National Airport) 38°51'N., 77°03'W. Elevation (ground) 14 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	5	5	(b)	22	22	5	5	16	13	17	17	17	17	17	17	24	22	17	17
Jan.	44.3	29.5	36.9	65	3	3.03	1.73	4.9	69	54	9.0	NW	49NW	49	6.5	8	7	16	11	2	*	2
Feb.	46.1	29.4	37.8	70	4	2.47	1.63	4.8	69	56	9.3	S	50SW	51	6.4	7	7	14	9	1	*	2
Mar.	53.8	35.8	44.8	86	16	3.21	3.43	3.0	69	48	10.0	NW	52E	56	6.2	8	9	14	12	1	1	1
Apr.	65.8	45.6	55.7	89	30	3.15	1.77	T	69	48	9.5	S	49N	55	6.4	7	9	14	10	0	3	1
May	75.5	56.0	65.8	96	41	4.14	4.32	T	71	48	8.3	S	42S	58	6.3	7	11	13	11	0	5	1
June	83.4	64.9	74.2	100	51	3.21	3.67	0.0	76	52	7.8	S	50NW	65	5.7	8	12	10	9	0	5	*
July	87.0	69.3	78.2	97	56	4.15	2.97	0.0	76	51	7.3	S	47E	64	5.8	8	12	11	10	0	6	*
Aug.	85.0	67.9	76.5	99	51	4.90	6.39	0.0	78	53	7.2	S	43NE	62	5.7	10	9	12	9	0	5	*
Sept.	78.6	60.7	69.7	95	39	3.83	3.63	0.0	81	55	7.5	S	49SE	63	5.3	11	8	11	8	0	2	1
Oct.	68.3	49.6	59.0	89	30	3.07	4.98	T	78	48	7.6	SSW	68SE	62	5.0	13	7	11	7	0	1	2
Nov.	56.5	38.9	47.7	81	22	2.84	2.60	0.6	73	51	8.1	S	52E	53	5.9	9	8	13	8	*	*	2
Dec.	45.6	30.5	38.1	72	10	2.78	1.85	3.6	71	57	8.2	NW	54SW	49	6.3	9	7	15	9	1	*	3
Year	65.8	48.2	57.0	100	3	40.78	6.39	16.9	73	52	8.3	S	68SE	58	6.0	105	106	154	112	5	29	14

## APPENDIX

RICHMOND, Va. (Byrd Field) 37°30'N., 77°20'W. Elevation (ground) 162 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a. m. EST	1:00 p. m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	36	36	(b)	28	28	31	31	16	15	15	15	20	20	20	20	28	28	28	36
Jan.	48.3	29.0	38.7	80	-12	3.46	3.31	5.2	81	57	7.0	S	35S	51	6.4	9	6	16	10	1	*	3
Feb.	50.6	29.2	39.9	83	-10	2.90	1.56	3.1	80	53	7.4	NNE	39SW	53	6.1	9	6	13	9	1	*	2
Mar.	59.1	36.3	47.7	93	11	3.42	2.04	3.1	78	48	7.9	W	36SE	57	6.2	8	9	14	11	1	1	2
Apr.	70.4	45.8	58.1	96	26	3.15	2.07	0.2	75	46	7.9	S	35NW	61	6.2	7	10	13	10	*	2	2
May	79.3	54.6	67.0	100	31	3.72	2.30	0.0	78	49	6.8	SSW	39N	64	6.2	7	11	13	10	0	6	2
June	86.8	63.4	75.1	104	41	3.75	4.61	0.0	81	53	6.3	S	45NW	66	6.0	7	12	11	10	0	7	2
July	89.4	66.7	78.1	104	51	5.61	4.90	0.0	85	56	6.1	SSW	49NW	67	6.0	7	12	12	11	0	9	2
Aug.	86.5	65.4	76.0	102	46	5.54	8.79	0.0	88	57	5.8	S	47W	64	6.0	8	11	12	10	0	7	3
Sept.	81.8	58.6	70.0	103	37	3.65	3.82	0.0	89	56	6.1	S	39SE	64	5.6	10	8	12	8	0	3	3
Oct.	70.6	46.7	58.7	99	21	3.00	6.50	T	89	52	6.2	NNE	59SE	62	5.1	13	6	12	7	0	1	3
Nov.	59.9	37.1	48.5	86	10	3.04	4.07	0.5	84	50	6.6	S	30S	55	5.7	10	7	13	9	*	1	2
Dec.	49.8	29.5	39.7	78	-1	2.97	3.16	1.8	81	54	6.5	SW	35SE	52	6.0	10	7	14	8	1	*	3
Year	69.4	46.9	58.1	104	-12	44.21	8.79	13.9	82	53	6.7	S	59SE	60	6.0	105	105	155	115	4	38	29

NORFOLK, Va. (Municipal Airport) 36°53'N., 76°12'W. Elevation (ground) 26 feet. WB-1965

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme		Normal total	Maximum 24 hrs.	Snow, sleet mean total	7:00 a.m. EST	1:00 p.m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Sunrise to sunset			Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest											Clear	Partly cloudy	Cloudy				
(a)	(b)	(b)	(b)	17	17	(b)	17	17	17	17	16	15	12	12	17	17	17	17	17	17	17	17
Jan.	50.2	32.2	41.2	77	12	3.33	2.26	3.1	77	60	10.0	SW	49SW	58	6.2	9	7	15	10	1	*	2
Feb.	51.0	32.2	41.6	78	8	3.21	1.70	1.7	77	56	10.4	NNE	57SW	56	6.3	8	6	14	10	1	*	3
Mar.	57.2	38.7	48.0	85	20	3.45	3.18	0.7	74	54	10.9	SW	50W	60	6.1	9	7	15	12	*	2	2
Apr.	68.0	47.9	58.0	97	28	3.16	2.40	0.1	74	51	10.3	SW	54N	64	5.9	8	10	12	11	*	3	2
May	77.3	57.7	67.5	97	36	3.36	2.94	0.0	78	56	8.5	SW	46SW	66	6.0	8	11	12	10	0	6	2
June	84.9	66.3	75.6	101	48	3.61	6.85	0.0	79	57	7.9	SW	42NW	65	5.7	8	12	10	9	0	6	2
July	87.9	69.6	78.8	103	57	5.92	3.57	0.0	82	59	7.4	SW	55SW	63	5.9	8	12	11	11	0	8	1
Aug.	86.2	68.8	77.5	97	52	5.97	11.40	0.0	85	62	7.6	SW	50NE	63	5.8	8	12	11	11	0	8	2
Sept.	80.9	64.3	72.6	98	46	4.22	6.79	0.0	84	62	8.4	NE	63W	63	5.7	9	9	12	8	0	3	2
Oct.	70.9	53.1	62.0	95	29	2.92	4.19	0.0	84	61	9.1	NE	68S	61	5.2	13	6	12	8	0	2	3
Nov.	61.0	41.8	51.4	85	20	3.05	3.35	T	81	56	9.4	SW	45SE	62	5.3	12	7	11	8	0	*	2
Dec.	51.8	33.1	42.5	77	14	2.74	2.12	1.5	77	58	9.5	SW	42NW	58	5.9	10	7	14	8	*	*	3
Year	68.9	50.5	59.7	103	8	44.94	11.40	7.1	79	58	9.1	SW	68S	61	5.8	110	106	149	116	2	38	25

## APPENDIX

MEAN SURFACE WATER TEMPERATURES (T) AND SALINITIES (S) -- ATLANTIC COAST

	Stations	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Mean	
		(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰	(T) °F	(S) ‰
	Sandy Hook, N. J. 40°28'N., 74°01'W.	28 34.9	23.0	34.9	23.0	39.5	21.7	48.5	20.4	58.6	22.0	68.4	24.2	74.3	25.9	74.3	25.9	69.5	26.1	59.0	25.9	48.9	25.0	38.8	24.1	54.1	23.9
	Atlantic City, N. J. 39°21'N., 74°25'W.	52 37.2	31.2	36.2	31.4	39.9	31.2	47.3	31.1	55.9	31.4	64.4	31.8	69.2	31.9	71.6	31.6	69.7	31.6	61.4	31.6	51.6	31.6	41.6	31.4	53.8	31.5
	Breakwater Hbr., Del. 38°47'N., 75°06'W.	21 37.6	28.2	37.2	28.4	42.2	27.8	50.2	27.3	59.6	28.1	68.3	28.6	73.1	29.8	73.6	30.1	71.4	29.9	62.4	29.8	52.4	29.5	42.0	29.0	55.8	28.9
	Philadelphia, Pa. 39°57'N., 75°08'W.	35 36.0	0.3	36.4	0.3	41.6	0.3	51.0	0.4	63.5	0.7	73.7	0.8	79.1	0.8	78.8	0.8	73.7	0.8	63.1	0.6	51.2	0.6	40.4	0.3	57.4	0.6
	Kiptopeke Beach, Va. 37°10'N., 75°59'W.	15 39.3	26.9	39.7	26.4	44.9	25.4	53.5	24.1	63.9	24.3	72.7	25.6	77.4	26.4	77.6	27.7	73.9	27.8	64.3	27.8	53.7	27.3	44.3	26.8	58.8	26.4
	Cape Charles, Va. 37°16'N., 76°01'W.	5 41.9	22.0	41.7	21.4	45.5	20.9	55.0	20.4	64.5	20.1	74.8	21.6	79.8	23.1	79.1	23.8	75.2	24.3	65.8	24.2	54.5	24.1	44.1	23.0	60.2	22.4
	Little Creek, Va. 36°55'N., 76°11'W.	5 39.8	21.8	41.1	20.9	46.4	19.1	54.9	19.3	65.2	20.3	74.0	21.8	78.6	24.2	79.5	23.9	74.8	23.8	65.4	24.1	55.3	23.3	45.0	22.5	60.0	22.1
	Old Pt. Comfort, Va. 37°00'N., 76°18'W.	9 42.5	19.3	42.5	18.3	48.4	16.7	57.2	17.1	67.1	17.8	75.0	19.0	80.1	20.8	79.1	21.6	75.1	21.7	65.9	21.6	54.9	21.7	45.2	20.1	61.1	19.6
	Richmond, Va. 37°32'N., 77°25'W.	19 40.4	0.2	42.4	0.2	48.2	0.2	58.6	0.3	69.8	0.4	77.5	0.6	82.4	0.6	81.5	0.4	75.9	0.4	64.7	0.3	52.5	0.2	41.9	0.2	61.3	0.3
	Gloucester Pt., Va. 37°15'N., 76°30'W.	16 39.9	20.1	40.6	19.0	46.0	17.8	55.7	17.1	67.1	17.0	75.1	18.3	79.8	20.1	80.0	20.9	75.8	21.3	66.1	21.4	55.0	21.4	44.6	20.8	60.5	19.6
	Washington, D. C. 38°52'N., 77°01'W.	22 37.4	0.0	38.7	0.0	46.0	0.0	57.2	0.0	68.7	0.2	77.5	0.3	82.8	0.4	81.6	0.3	76.5	0.3	65.0	0.2	52.9	0.0	40.8	0.0	60.4	0.1
	Solomons, Md. 38°19'N., 76°27'W.	28 38.0	14.9	37.7	14.4	43.0	12.8	52.8	11.0	65.0	10.6	74.5	11.1	79.9	12.4	80.2	13.5	75.5	14.8	65.5	16.0	54.6	16.7	43.3	16.0	59.2	13.7
	Cambridge, Md. 38°34'N., 76°04'W.	8 39.4	9.7	39.4	9.0	44.7	9.0	55.4	8.4	66.3	7.9	75.4	8.0	80.8	8.4	79.6	8.5	74.0	10.2	63.4	11.5	52.5	12.0	40.8	11.0	59.3	9.5
	Annapolis, Md. 38°59'N., 76°29'W.	19 37.2	11.1	37.1	10.6	42.9	9.2	53.4	6.9	65.3	6.7	74.5	7.9	80.3	9.2	79.7	10.2	74.9	11.6	64.9	13.1	53.0	14.0	41.7	12.4	58.7	10.2
	Baltimore, Md. 39°16'N., 76°35'W.	52 37.4	9.8	37.0	9.6	42.6	8.1	52.9	5.9	64.3	5.6	74.0	5.9	79.6	6.8	79.5	7.9	75.2	9.4	65.5	10.7	53.9	11.0	42.9	10.6	58.7	8.4

°/∞-- This symbol denotes the salinity of sea water, and is defined as the number of grams of salts in 1,000 grams of sea water.  
For sea water temperature and salinity in greater detail, see Coast and Geodetic Survey Publication 31-1, Surface Water Temperature and Salinity, Atlantic Coast, North and South America.

HOURS OF OPERATION OF FOG SIGNALS  
(U. S. Coast Guard)

Light station	15 Calendar years - 1950 thru 1964													Pre - 1950			
	Average													Max. 1 yr.	Ave.	For yrs.	Max. 1 yr.
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year				
Ambrose Channel Lightship, N. Y. 40°27.5'N., 73°50.2'W.	76	77	77	83	103	82	75	57	48	41	47	59	825	1169	1137	56	2051
Barneget Lightship, N. J. 39°45.8'N., 73°56.0'W.	47	58	43	69	80	58	37	16	16	21	22	41	508	915	850	16	---
Delaware Lightship, Del.* 38°27.3'N., 74°35.1'W.	59	88	72	79	76	69	16	19	50	42	14	28	612	790	---	--	---
Harbor of Refuge, Del. 38°48.9'N., 75°05.6'W.	42	53	47	38	41	41	21	23	12	18	21	39	396	703	436	44	562
Brandywine Shoal, Del. 38°59.2'N., 75°06.8'W.	62	75	63	47	50	44	28	24	27	22	35	53	530	840	516	47	1006
Miah Maull Shoal, N. J. 39°07.6'N., 75°12.6'W.	56	76	49	32	33	20	11	11	8	17	30	48	391	536	439	37	838
Ship John Shoal, N. J. 39°18.3'N., 75°22.6'W.	56	60	43	24	19	8	4	9	10	20	33	52	338	510	354	44	612
Cherry Id. Range Front, Del. 39°45.0'N., 75°29.7'W.	48	53	32	19	16	9	9	8	14	23	34	52	317	478	315	44	686
Little Tinticum Id. Range Front, N. J. 39°50.9'N., 75°15.2'W.	52	44	26	14	12	11	5	10	14	22	31	48	289	416	246	40	471
Fort Mifflin, Pa. 39°52.5'N., 75°12.6'W.	31	30	12	11	9	8	2	5	7	17	20	33	185	267	260	44	390
Five Fathom Bank Lightship, N. J. 38°47.3'N., 74°34.6'W.	43	72	68	80	78	62	33	24	19	25	23	36	563	1034	548	61	690
Chesapeake Lightship, Va. ** 36°58.7'N., 75°42.2'W.	52	73	57	46	48	31	18	17	17	21	23	32	435	863	652	14	1122
Cape Henry, Va. 36°55.6'N., 76°00.4'W.	48	62	40	31	37	24	8	13	18	22	28	43	374	582	359	65	667
Old Point Comfort, Va. 37°00.1'N., 76°18.4'W.	55	63	32	26	29	13	8	12	25	30	38	58	389	527	263	46	545
Wolf Trap, Va. 37°23.4'N., 76°11.4'W.	79	85	64	37	31	15	4	14	16	29	37	59	470	852	309	54	664
Smith Point, Va. 37°52.8'N., 76°11.0'W.	113	127	94	65	46	24	9	15	29	35	61	97	715	1128	442	50	1038
Point Lookout, Md. *** 38°02.3'N., 76°19.3'W.	77	81	60	39	27	9	2	8	11	22	37	57	430	642	345	44	558
Cove Point, Md. 38°23.2'N., 76°22.9'W.	70	84	69	42	27	16	9	29	13	22	39	61	481	865	344	47	1045
Thomas Point Shoal, Md. 38°53.9'N., 76°26.2'W.	77	80	71	44	28	15	7	6	21	24	45	78	496	804	349	44	764

\* Delaware Lightship was activated in March, 1961.

\*\* Chesapeake Lightship was superseded in September, 1965 by Chesapeake Light, 36°54.3'N., 75°42.8'W.

\*\*\* Light station was discontinued in January, 1966 and replaced by a minor light and automatic fog signal in 38°01.6'N., 76°19.3'W.

ATLANTIC OCEAN DISTANCES FOR DEEP-DRAFT VESSELS  
QUEBEC, CANADA, TO PANAMA CANAL ZONE

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N. Y., is 1399 nautical miles from San Juan, P. R.

[illegible]

Cape Cod Canal (Massachusetts), and the Chesapeake and Delaware Canal (Delaware-Maryland). See the detailed tables.

## COASTWISE DISTANCES

NEW YORK, N. Y., TO CHESAPEAKE BAY ENTRANCE, VA.

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N. Y., is 240 nautical miles from Philadelphia, Pa.

NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	MONTAUK POINT, N. Y. 41°01.7'N., 71°47.3'W.	New York, N. Y. 40°42.0'N., 74°01.0'W.	Manasquan Inlet, N. J. 40°06.1'N., 74°01.9'W.	Barnegat Inlet, N. J. 39°46.0'N., 74°06.3'W.	Atlantic City, N. J. 38°57.1'N., 74°24.9'W.	Cape May Harbor, N. J. 38°50.5'N., 74°52.6'W.	DELAWARE BAY ENTRANCE 38°49.0'N., 75°03.3'W.	Harbor of Refuge, Del. 38°49.0'N., 75°05.2'W.	C. & D. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	Wilmington, Del. 39°43.2'N., 75°31.5'W.	Marcus Hook, Pa. 39°50.0'N., 75°25.2'W.	Chester, Pa. 39°56.8'N., 75°08.3'W.	Trenton, N. J. 40°11.4'N., 74°45.4'W.	Indian River Inlet, Del. 38°36.5'N., 75°03.6'W.	Ocean City, Md. 37°56.1'N., 75°22.8'W.	Chincoteague, Md. 36°56.3'N., 75°58.6'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.
113	223	122	40	32	37	16	2	52	11	8	3	15	23	5	20	41	69
223	117	40	32	37	16	2	52	11	8	3	15	23	5	20	41	69	
221	131	63	22	32	37	16	2	52	11	8	3	15	23	5	20	41	
242	159	94	52	32	37	16	2	52	11	8	3	15	23	5	20	41	
271	192	128	85	65	37	16	2	52	11	8	3	15	23	5	20	41	
285	212	153	97	78	49	16	2	52	11	8	3	15	23	5	20	41	
285	212	153	98	79	50	17	2	52	11	8	3	15	23	5	20	41	
336	263	204	148	129	100	67	51	52	11	8	3	15	23	5	20	41	
347	274	215	159	140	111	78	62	63	11	8	3	15	23	5	20	41	
353	280	221	165	146	117	84	68	69	17	8	3	15	23	5	20	41	
356	283	224	169	150	121	88	72	73	21	11	3	15	23	5	20	41	
372	299	240	184	165	136	103	87	88	36	26	18	15	23	5	20	41	
395	322	263	207	188	159	126	110	111	59	49	41	38	23	5	20	41	
400	327	268	212	193	164	131	115	116	64	54	46	43	28	5	20	41	
285	209	145	105	86	57	24	15	14	66	77	83	86	101	124	129	100	
295	227	161	121	101	73	40	32	31	83	95	101	104	119	142	147	118	
328	262	201	161	141	113	80	72	71	123	134	140	144	159	182	187	160	
381	322	267	219	199	171	141	155	155	206	218	224	227	242	265	270	242	

# DISTANCES BY NEW JERSEY INTRACOASTAL WATERWAY

MANASQUAN INLET, N. J., TO CAPE MAY CANAL, N. J.

May 21, 1966

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Atlantic City, N. J., is 13 nautical miles from Ocean City, N. J.

New York, N. Y. (Battery)*	Shark River Inlet *	Manasquan Inlet *	Bay Head	Mantoloking	Toms River (town)	Seaside Park	Forked River (town)	Barnegat Inlet	Beach Haven	Atlantic City	Mays Landing	Ocean City	Sea Isle City	Avalon	Stone Harbor	Wildwood	Cape May Harbor	Cape May Canal W. Ent.	C. & D. CANAL E. ENT., Del.	
40°42.0'N., 74°01.0'W.	40°11.2'N., 74°00.5'W.	40°06.1'N., 74°01.9'W.	40°03.8'N., 74°03.1'W.	40°02.2'N., 74°03.4'W.	39°56.9'N., 74°03.1'W.	39°56.9'N., 74°11.8'W.	39°55.3'N., 74°05.0'W.	39°50.1'N., 74°11.7'W.	39°46.0'N., 74°06.3'W.	39°34.0'N., 74°14.8'W.	39°22.6'N., 74°24.9'W.	39°26.9'N., 74°43.4'W.	39°17.3'N., 74°34.4'W.	39°09.4'N., 74°42.0'W.	39°06.6'N., 74°44.0'W.	39°03.4'N., 74°46.0'W.	39°00.5'N., 74°49.8'W.	38°57.1'N., 74°52.6'W.	38°58.0'N., 74°58.0'W.	39°33.8'N., 75°32.8'W.
34	6	4	2	12	7	10	8	20	18	30	18	11	4	5	5	5	4	4	48	
40	9	6	4	14	10	13	21	38	44	25	29	15	9	10	10	9	9	52	57	
44	11	8	6	16	12	15	23	40	46	27	31	17	11	12	11	10	10	6	62	
46	13	10	8	18	14	17	25	42	48	29	33	19	13	14	12	11	11	8	67	
48	15	12	10	20	16	19	27	44	50	31	35	21	15	16	14	13	12	10	71	
50	17	14	12	22	18	21	29	46	52	33	37	23	17	18	16	15	14	12	76	
52	19	16	14	24	20	23	31	48	54	35	39	25	19	20	18	17	16	14	81	
54	21	18	16	26	22	25	33	50	56	37	41	27	21	22	20	19	18	16	86	
56	23	20	18	28	24	27	35	52	58	39	43	29	23	24	22	21	20	18	91	
58	25	22	20	30	26	29	37	54	60	41	45	31	25	26	24	23	22	20	96	
60	27	24	22	32	28	31	39	56	62	43	47	33	27	28	26	25	24	22	101	
62	29	26	24	34	30	33	41	58	64	45	49	35	29	30	28	27	26	24	106	
64	31	28	26	36	32	35	43	60	66	47	51	37	31	32	30	29	28	26	111	
66	33	30	28	38	34	37	45	62	68	49	53	39	33	34	32	31	30	28	116	
68	35	32	30	40	36	39	47	64	70	51	55	41	35	36	34	33	32	30	121	
70	37	34	32	42	38	41	49	66	72	53	57	43	37	38	36	35	34	32	126	
72	39	36	34	44	40	43	51	68	74	55	59	45	39	40	38	37	36	34	131	
74	41	38	36	46	42	45	53	70	76	57	61	47	41	42	40	39	38	36	136	
76	43	40	38	48	44	47	55	72	78	59	63	49	43	44	42	41	40	38	141	
78	45	42	40	50	46	49	57	74	80	61	65	51	45	46	44	43	42	40	146	
80	47	44	42	52	48	51	59	76	82	63	67	53	47	48	46	45	44	42	151	
82	49	46	44	54	50	53	61	78	84	65	69	55	49	50	48	47	46	44	156	
84	51	48	46	56	52	55	63	80	86	67	71	57	51	52	50	49	48	46	161	
86	53	50	48	58	54	57	65	82	88	69	73	59	53	54	52	51	50	48	166	
88	55	52	50	60	56	59	67	84	90	71	75	61	55	56	54	53	52	50	171	
90	57	54	52	62	58	61	69	86	92	73	77	63	57	58	56	55	54	52	176	
92	59	56	54	64	60	63	71	88	94	75	79	65	59	60	58	57	56	54	181	
94	61	58	56	66	62	65	73	90	96	77	81	67	61	62	60	59	58	56	186	
96	63	60	58	68	64	67	75	92	98	79	83	69	63	70	68	67	66	64	191	
98	65	62	60	70	66	69	77	94	100	81	85	71	65	72	70	69	68	66	196	
100	67	64	62	72	68	71	79	96	102	83	87	73	67	74	72	71	70	68	201	
102	69	66	64	74	70	73	81	98	104	85	89	75	69	76	74	73	72	70	206	
104	71	68	66	76	72	75	83	100	106	87	91	77	71	78	76	75	74	72	211	
106	73	70	68	78	74	77	85	102	108	89	93	79	73	80	78	77	76	74	216	
108	75	72	70	80	76	79	87	104	110	91	95	81	75	82	80	79	78	76	221	
110	77	74	72	82	78	81	89	106	112	93	97	83	77	84	82	81	80	78	226	
112	79	76	74	84	80	83	91	108	114	95	99	85	79	86	84	83	82	80	231	
114	81	78	76	86	82	85	93	110	116	97	101	87	81	88	86	85	84	82	236	
116	83	80	78	88	84	87	95	112	118	99	103	89	83	90	88	87	86	84	241	
118	85	82	80	90	86	89	97	114	120	101	105	91	85	92	90	89	88	86	246	
120	87	84	82	92	88	91	99	116	122	103	107	93	87	94	92	91	90	88	251	
122	89	86	84	94	90	93	101	118	124	105	109	95	89	96	94	93	92	90	256	
124	91	88	86	96	92	95	103	120	126	107	111	97	91	98	96	95	94	92	261	
126	93	90	88	98	94	97	105	122	128	109	113	99	93	100	98	97	96	94	266	
128	95	92	90	100	96	99	107	124	130	111	115	101	95	102	100	99	98	96	271	
130	97	94	92	102	98	101	109	126	132	113	117	103	97	104	102	101	100	98	276	
132	99	96	94	104	100	103	111	128	134	115	119	105	99	106	104	103	102	100	281	
134	101	98	96	106	102	105	113	130	136	117	121	107	101	108	106	105	104	102	286	
136	103	100	98	108	104	107	115	132	138	119	123	109	103	110	108	107	106	104	291	
138	105	102	100	110	106	109	117	134	140	121	125	111	105	112	110	109	108	106	296	
140	107	104	102	112	108	111	119	136	142	123	127	113	107	114	112	111	110	108	301	
142	109	106	104	114	110	113	121	138	144	125	129	115	109	116	114	113	112	110	306	
144	111	108	106	116	112	115	123	140	146	127	131	117	111	118	116	115	114	112	311	
146	113	110	108	118	114	117	125	142	148	129	133	119	113	120	118	117	116	114	316	
148	115	112	110	120	116	119	127	144	150	131	135	121	115	122	120	119	118	116	321	
150	117	114	112	122	118	121	129	146	152	133	137	123	117	124	122	121	120	118	326	
152	119	116	114	124	120	123	131	148	154	135	139	125	119	126	124	123	122	120	331	
154	121	118	116	126	122	125	133	150	156	137	141	127	121	128	126	125	124	122	336	
156	123	120	118	128	124	127	135	152	158	139	143	129	123	130	128	127	126	124	341	
158	125	122	120	130	126	129	137	154	160	141	145	131	125	132	130	129	128	126	346	
160	127	124	122	132	128	131	139	156	162	143	147	133	127	134	132	131	130	128	351	
162	129	126	124	134	130	133	141	158	164	145	149	135	129	136	134	133	132	130	356	
164	131	128	126	136	132	135	143	160	166	147	151	137	131	138	136	135	134	132	361	
166	133	130	128	138	134	137	145	162	168	149	153	139	133	140	138	137	136	134	366	
168	135	132	130	140	136	139	147	164	170	151	155	141	135	142	140	139	138	136	371	
170	137	134	132	142	138	141	149	166	172	153	157	143	137	144	142	141	140	138	376	
172	139	136	134	144	140	143	151	168	174	155	159	145	139	146	144	143	142	140	381	
174	141	138	136	146	142	145	153	170	176	157	161	147	141	148	146	145	144	142	386	
176	143	140	138	148	144	147	155	172	178	159	163	149	143	150	148	147	146	144	391	
178	145	142	140	150	146	149	157	174	180	161	165	151	145	152	150	149	148	146	396	
180	147	144	142	152	148	151	159	176	182	163	167	153	147	154	152	151	150	148	401	
182	149	146	144	154	150	153	161	178	184	165	169	155	149	156	154	153	152	150	406	
184	151	148	146	156	152	155	163	180	186	167	171	157	151	158	156	155	154	152	411	
186	153	150	148	158	154	157	165	182	188	169	173	159</								



## CHESAPEAKE BAY DISTANCES

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Washington, D.C., is 155 nautical miles from Annapolis, Md.

CHESAPEAKE BAY DISTANCES

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Washington, D. C., is 155 nautical miles from Annapolis, Md.

C. & D. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	Chesapeake City, Md. 39°31.8'N., 75°48.9'W.	Haure de Grace, Md. 39°32.7'N., 76°05.0'W.	Baltimore, Md. 39°16.0'N., 76°03.8'W.	Chestertown, Md. 39°12.4'N., 76°34.5'W.	Annapolis, Md. 38°59.0'N., 76°03.8'W.	St. Michaels, Md. 38°47.2'N., 76°28.6'W.	Cambridge, Md. 38°34.4'N., 76°13.2'W.	Solomons, Md. 38°19.2'N., 76°04.3'W.	Salisbury, Md. 38°21.9'N., 76°27.4'W.	Potomac River Mouth 37°57.7'N., 75°36.3'W.	Washington, D. C. 38°52.4'N., 76°16.7'W.	Cristfield, Md. 37°58.6'N., 77°01.4'W.	Fredricksburg, Va. 38°17.8'N., 75°51.9'W.	Cape Charles, Va. 37°15.9'N., 77°27.2'W.	Yorktown, Va. 37°14.4'N., 76°01.4'W.	West Point, Va. 37°31.6'N., 76°30.5'W.	Newport News, Va. 36°58.0'N., 76°48.1'W.	Suffolk, Va. 36°44.3'N., 76°26.0'W.	Hopewell, Va. 37°19.0'N., 76°35.0'W.	Petersburg, Va. 37°14.1'N., 77°16.4'W.	Richmond, Va. 37°31.4'N., 77°24.0'W.	Norfolk, Va. 36°50.9'N., 76°17.9'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.																
13	143	121	115	98	110	77	80	72	42	43	27	121	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27							
33	122	109	101	84	96	64	65	58	27	49	118	141	96	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27						
62	78	65	61	45	28	40	59	25	36	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27				
78	65	52	45	28	40	59	25	36	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27		
83	70	62	45	28	40	59	25	36	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27		
98	85	78	60	72	39	36	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	
103	90	84	66	78	45	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27		
143	130	124	107	119	86	89	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27
122	109	101	84	96	64	65	58	27	49	118	141	96	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	
213	200	192	175	187	155	156	149	118	141	96	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27
134	121	115	98	110	77	80	72	42	43	27	121	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27		
243	230	224	206	219	186	190	182	150	165	125	221	129	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	
169	156	149	132	146	112	116	107	76	87	50	146	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	
192	179	163	155	156	130	126	117	87	100	68	164	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	
214	201	185	174	178	152	149	140	109	122	90	186	86	154	50	22	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	
207	194	172	170	167	136	138	129	97	110	86	182	74	143	29	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27		
209	196	190	172	185	152	156	147	115	128	89	185	92	161	48	55	78	21	63	58	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27		
265	252	230	228	225	194	196	187	155	168	144	240	132	201	88	114	122	58	79	36	48	39	81	51	122	64	132	28	86	154	50	22	55	78	21	63	58	89	10	28
259	246	240	222	235	204	206	197	165	178	137	233	142	211	97	101	123	68	89	10	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	
284	271	249	247	244	213	215	206	174	187	163	259	151	220	106	132	140	77	98	19	28	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	
209	196	175	173	170	140	141	132	100	113	89	185	77	146	32	58	66	12	29	70	80	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27	
187	174	166	150	162	129	132	123	92	103	67	163	67	136	21	34	56	24	42	82	92	101	27	90	101	27	90	101	27	90	101	27	90	101	27	90	101	27		

**Radio Bearing Conversion Table**  
*Table of corrections, in minutes*  
**[DIFFERENCE OF LONGITUDE IN DEGREES]**

Mid. L.	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
15°	4	8	12	16	19	23	27	31	35	40	43	47	50	54	58	62	66	70	74	78
16°	4	8	12	17	21	25	29	33	37	41	45	50	54	58	62	66	70	74	79	83
17°	4	9	13	18	22	26	31	35	39	44	48	53	57	61	66	70	75	79	83	88
18°	5	9	13	19	23	28	32	37	42	46	51	56	60	65	70	74	79	83	88	93
19°	5	10	15	20	24	29	34	39	44	49	54	59	63	68	73	78	83	88	93	98
20°	5	10	15	21	26	31	36	41	46	51	56	62	67	72	77	82	87	92	98	103
21°	5	11	16	21	27	32	38	43	48	54	59	64	70	75	81	86	91	97	102	108
22°	6	11	17	22	28	34	39	45	51	56	62	67	73	79	84	90	96	101	107	112
23°	6	12	18	23	29	35	41	47	53	59	64	70	76	82	88	94	100	105	111	117
24°	6	12	18	24	31	37	43	49	55	61	67	73	79	85	92	98	104	110	116	122
25°	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95	101	108	114	120	127
26°	7	13	20	26	33	39	46	53	59	66	72	79	85	92	99	105	112	118	125	131
27°	7	14	20	27	34	41	48	54	61	68	75	82	89	95	102	109	116	123	129	136
28°	7	14	21	28	35	42	49	56	63	70	77	84	92	99	106	113	120	127	134	141
29°	7	15	21	29	36	44	51	58	65	73	80	87	95	102	109	116	124	131	138	145
30°	7	15	22	30	38	45	53	60	68	75	83	90	98	105	113	120	127	135	143	150
31°	8	15	23	31	39	46	54	62	70	77	85	93	100	108	116	124	131	139	146	155
32°	8	16	24	32	40	48	56	64	72	79	87	95	103	111	119	127	135	143	151	159
33°	8	16	25	33	41	49	57	65	74	82	90	98	106	114	123	131	139	147	155	163
34°	8	17	25	34	42	50	59	67	75	84	92	101	109	117	126	134	143	151	159	168
35°	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129	138	146	155	163	172
36°	9	18	26	35	44	53	62	71	79	88	97	106	115	123	132	141	150	159	168	176
37°	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	163	172	181
38°	9	18	28	37	46	55	65	74	83	92	102	111	120	129	139	148	157	166	175	185
39°	9	19	28	38	47	57	66	75	85	94	104	113	123	132	142	151	160	170	179	189
40°	10	19	29	39	48	58	68	77	87	96	106	116	125	135	145	154	164	174	183	193
41°	10	20	30	39	49	59	69	79	89	98	108	118	128	138	148	157	167	177	187	197
42°	10	20	30	40	50	60	70	80	90	100	110	120	130	140	151	161	171	181	191	201
43°	10	20	31	41	51	61	72	82	92	102	113	123	133	143	153	164	174	184	194	205
44°	10	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167	177	188	198	208
45°	11	21	32	42	53	64	74	85	95	106	117	127	138	149	159	170	180	191	201	212
46°	11	22	32	43	54	65	76	86	97	108	119	129	140	151	162	173	183	194	205	216
47°	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	186	197	208	219
48°	11	22	33	45	56	67	78	89	100	111	123	134	145	156	167	178	190	201	212	223
49°	11	23	34	45	57	68	79	91	102	113	125	136	147	158	170	181	192	204	215	226
50°	11	23	34	46	57	69	80	92	103	115	126	138	149	161	172	184	195	207	218	230
51°	12	23	35	47	58	70	82	93	105	117	128	140	152	163	175	186	198	210	221	233
52°	12	24	35	47	59	71	83	95	106	118	130	142	154	165	177	189	201	213	225	236
53°	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
54°	12	24	36	49	61	73	85	97	109	121	133	146	158	170	182	194	206	218	231	243
55°	12	25	37	49	61	74	86	98	111	123	135	147	160	172	184	197	209	221	233	246
56°	12	25	37	50	62	75	87	100	112	124	137	149	162	174	187	199	211	224	236	249
57°	13	25	38	50	63	75	88	101	113	126	138	151	164	176	189	201	214	226	239	252
58°	13	25	38	51	64	76	89	102	115	127	140	153	165	178	191	204	216	229	242	254
59°	13	26	39	51	64	77	90	103	116	129	141	154	167	180	193	206	219	231	244	257
60°	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260

**Example.** A ship in latitude 39°51' N., longitude 67°35' W., by dead reckoning, obtains a radio bearing of 299° true on the radiobeacon located in latitude 40°37' N., longitude 69°37' W.

Radiobeacon station..... Latitude 40°37' N.

Dead-reckoning position of ship..... Latitude 39°51'

Middle latitude..... 40°14'

Radiobeacon station..... Longitude 69°37' W.

Dead reckoning position of ship..... Longitude 67°35'

Longitude difference..... 2°02'

Entering the table with difference of longitude equals 2°, which is the nearest tabulated value and opposite 40° middle latitude, the correction of 39' is read.

As the ship is east of the radiobeacon, a minus correction is applied. The Mercator bearing then will be 299°—000°39'=298°21'. To facilitate plotting, subtract 180° and plot from the position of the radiobeacon the bearing 298°21'—180°, or 118°21' (Mercator bearing reckoned clockwise from true north).

### Distance of Visibility of Objects at Sea

The following table gives the approximate geographic range of visibility for an object which may be seen by an observer whose eye is at sea level; in practice, therefore, it is necessary to add to these a distance of visibility corresponding to the height of the observer's eye above sea level.

Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles
6	2.8	48	7.9	220	17.0	660	29.4	2,000	51.2
8	3.1	50	8.1	240	17.7	680	29.9	2,200	53.8
10	3.6	55	8.5	260	18.5	700	30.3	2,400	56.2
12	4.0	60	8.9	280	19.2	720	30.7	2,600	58.5
14	4.3	65	9.2	300	19.9	740	31.1	2,800	60.6
15	4.4	70	9.6	320	20.5	760	31.6	3,000	62.8
16	4.6	75	9.9	340	21.1	780	32.0	3,200	64.9
18	4.9	80	10.3	360	21.7	800	32.4	3,400	66.9
20	5.1	85	10.6	380	22.3	820	32.8	3,600	68.6
22	5.4	90	10.9	400	22.9	840	33.2	3,800	70.7
24	5.6	95	11.2	420	23.5	860	33.6	4,000	72.5
26	5.8	100	11.5	440	24.1	880	34.0	4,200	74.3
28	6.1	110	12.0	460	24.6	900	34.4	4,400	76.1
30	6.3	120	12.6	480	25.1	920	34.7	4,600	77.7
32	6.5	130	13.1	500	25.6	940	35.2	4,800	79.4
34	6.7	140	13.6	520	26.1	960	35.5	5,000	81.0
36	6.9	150	14.1	540	26.7	980	35.9	6,000	88.8
38	7.0	160	14.5	560	27.1	1,000	36.2	7,000	96.0
40	7.2	170	14.9	580	27.6	1,200	39.6	8,000	102.6
42	7.4	180	15.4	600	28.0	1,400	42.9	9,000	108.7
44	7.6	190	15.8	620	28.6	1,600	45.8	10,000	114.6
46	7.8	200	16.2	640	29.0	1,800	48.6		

### Conversion Table, Degrees to Points and Vice Versa

° /	Points	° /	Points	° /	Points	° /	Points
0 00	N	90 00	E	180 00	S	270 00	W
2 49		92 49		182 49		272 49	
5 38	N ½ E	95 38	E ½ S	185 38	S ½ W	275 38	W ½ N
8 26		98 26		188 26		278 26	
11 15	N x E	101 15	E x S	191 15	S x W	281 15	W x N
14 04		104 04		194 04		284 04	
16 53	N x E ½ E	106 53	ESE ½ E	196 53	S x W ½ W	286 53	WNW ½ W
19 41		109 41		199 41		289 41	
22 30	NNE	112 30	ESE	202 30	SSW	292 30	WNW
25 19		115 19		205 19		295 19	
28 08	NNE ½ E	118 08	SE x E ½ E	208 08	SSW ½ W	298 08	NW x W ½ W
30 56		120 56		210 56		300 56	
33 45	NE x N	123 45	SE x E	213 45	SW x S	303 45	NW x W
36 34		126 34		216 34		306 34	
39 23	NE ½ N	129 23	SE ½ E	219 23	SW ½ S	309 23	NW ½ W
42 11		132 11		222 11		312 11	
45 00	NE	135 00	SE	225 00	SW	315 00	NW
47 49		137 49		227 49		317 49	
50 38	NE ½ E	140 38	SE ½ S	230 38	SW ½ W	320 38	NW ½ N
53 26		143 26		233 26		323 26	
56 15	NE x E	146 15	SE x S	236 15	SW x W	326 15	NW x N
59 04		149 04		239 04		329 04	
61 53	NE x E ½ E	151 53	SSE ½ E	241 53	SW x W ½ W	331 53	NNW ½ W
64 41		154 41		244 41		334 41	
67 30	ENE	157 30	SSE	247 30	WSW	337 30	NNW
70 19		160 19		250 19		340 19	
73 08	ENE ½ E	163 08	S x E ½ E	253 08	WSW ½ W	343 08	N x W ½ W
75 56		165 56		255 56		345 56	
78 45	E x N	168 45	S x E	258 45	W x S	348 45	N x W
81 34		171 34		261 34		351 34	
84 23	E ½ N	174 23	S ½ E	264 23	W ½ S	354 23	N ½ W
87 11		177 11		267 11		357 11	

## BEAUFORT SCALE OF WIND FORCE

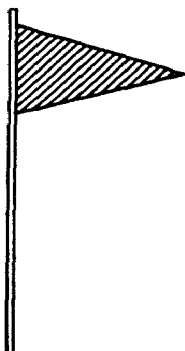
Beaufort Number	Miles per Hour	Knots	Wind Effects Observed at Sea	Terms Used In U. S. W. B. Forecasts
0	Less than 1	Less than 1	Sea like a mirror .....	Light
1	1-3	1-3	Ripples with the appearance of scales formed, but without foam crests	
2	4-7	4-6	Small wavelets, short but pronounced; crests appear glassy, do not break	
3	8-12	7-10	Large wavelets with crests beginning to break; foam appears glassy. Perhaps scattered white horses (white foam crests).	Gentle
4	13-18	11-16	Small waves, becoming longer; fairly frequent white horses .....	Moderate
5	19-24	17-21	Moderate waves of a pronounced long form; many white horses, possibly some spray.	Fresh
6	25-31	22-27	Large waves begin to form; white foam crests more extensive everywhere; probably some spray.	Strong
7	32-38	28-33	Sea heaps up; some white foam from breaking waves blows in streaks along the direction of the wind.	
8	39-46	34-40	Moderately high waves. Edges of crests begin to break into spindrift. Well-marked streaks of foam blow along direction of wind.	Gale
9	47-54	41-47	High waves. Dense streaks of foam along direction of wind. Spray may affect visibility.	
10	55-63	48-55	Very high waves with long overhanging crests; great patches of foam blown in dense white streaks along direction of wind. Sea surface takes on a white appearance. Visibility affected.	Whole gale
11	64-72	56-63	Exceptionally high waves; sea completely covered with long white patches of foam lying along direction of wind; edges of wave crests everywhere blown into froth. Visibility affected.	
12 or more	73 or more	64 or more	Air filled with foam and spray; sea completely white with driving spray. Visibility very seriously affected.	Hurricane



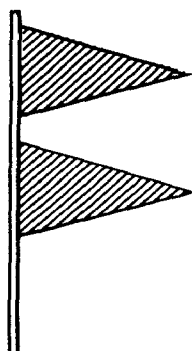
## SMALL CRAFT, GALE, WHOLE GALE AND HURRICANE WARNINGS

### DAYTIME SIGNALS

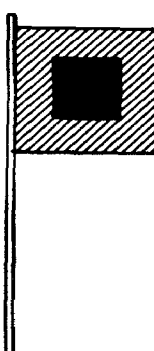
SMALL CRAFT



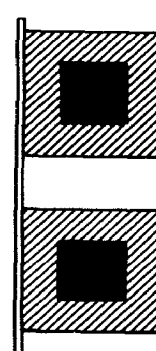
GALE



WHOLE GALE



HURRICANE



### NIGHT SIGNALS

SMALL CRAFT



GALE



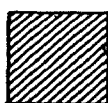
WHOLE GALE



HURRICANE



### LEGEND:



-RED



-WHITE



-BLACK

### EXPLANATION OF DISPLAY SIGNALS

**SMALL CRAFT WARNING:** One red pennant displayed by day and a red light above a white light at night to indicate winds up to 33 knots and/or sea conditions dangerous to small craft operations are forecast for the area.

**GALE WARNING:** Two red pennants displayed by day and a white light above a red light at night to indicate winds ranging from 34 to 47 knots are forecast for the area.

**WHOLE GALE WARNING:** A single square red flag with a black center displayed during daytime and two red lights at night to indicate winds ranging from 48 to 63 knots are forecast for the area.

**HURRICANE WARNING:** Two square red flags with black centers displayed by day and a white light between two red lights at night to indicate that winds 64 knots and above are forecast for the area.

## Conversion Tables

## INTERNATIONAL NAUTICAL MILES TO STATUTE MILES

1 nautical mile 6,076.10 feet or 1,852 meters 1 statute mile = 5,280 feet or 1,609.35 meters

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0.000	1.151	2.302	3.452	4.603	5.754	6.905	8.055	9.206	10.357
10	11.508	12.659	13.809	14.960	16.111	17.262	18.412	19.563	20.714	21.865
20	23.016	24.166	25.317	26.468	27.619	28.769	29.920	31.071	32.222	33.373
30	34.523	35.674	36.825	37.976	39.126	40.277	41.428	42.579	43.730	44.880
40	46.031	47.182	48.333	49.483	50.634	51.785	52.936	54.087	55.237	56.388
50	57.539	58.690	59.840	60.991	62.142	63.293	64.444	65.594	66.745	67.896
60	69.047	70.197	71.348	72.499	73.650	74.801	75.951	77.102	78.253	79.404
70	80.554	81.705	82.856	84.007	85.158	86.308	87.459	88.610	89.761	90.911
80	92.062	93.213	94.364	95.515	96.665	97.816	98.967	100.118	101.268	102.419
90	103.570	104.721	105.871	107.022	108.173	109.324	110.475	111.625	112.776	113.927

## STATUTE MILES TO INTERNATIONAL NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0.000	0.869	1.738	2.607	3.476	4.345	5.214	6.083	6.952	7.821
10	8.690	9.559	10.428	11.297	12.166	13.035	13.904	14.773	15.642	16.511
20	17.380	18.249	19.118	19.986	20.855	21.724	22.593	23.462	24.331	25.200
30	26.069	26.938	27.807	28.676	29.545	30.414	31.283	32.152	33.021	33.890
40	34.759	35.628	36.497	37.366	38.235	39.104	39.973	40.842	41.711	42.580
50	43.449	44.318	45.187	46.056	46.925	47.794	48.663	49.532	50.401	51.270
60	52.139	53.008	53.877	54.746	55.615	56.484	57.353	58.222	59.091	59.959
70	60.828	61.697	62.566	63.435	64.304	65.173	66.042	66.911	67.780	68.649
80	69.518	70.387	71.256	72.125	72.994	73.863	74.732	75.601	76.470	77.339
90	78.208	79.077	79.946	80.815	81.684	82.553	83.422	84.291	85.160	86.029

## FEET TO METERS

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

## METERS TO FEET

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

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